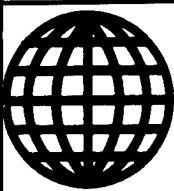


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UDC 629.78:612.825.22.014.2

UDC 629.78:612.816.014.2

Quantitative Analysis of Dendritic Spikes in Layer 5 of Rat Sensorimotor Cortex Following Space Flight Aboard Biosputnik Kosmos-1667
18400077d Moscow BYULLETEN
EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 105 No 6, Jun 88 (manuscript received 25 Aug 87) pp 736-738

[Article by P. V. Belichenko, Laboratory of Neuronal Brain Structural, Brain Institute, All-Union Scientific Center of Mental Health, USSR Academy of Medical Sciences, Moscow]

[Abstract] Cytometric studies were conducted on layer 5 of the rat sensorimotor cortex to assess the effects of a 7 day space flight aboard biosputnik Kosmos-1667. The experiments were conducted with male Wistar-SPF rats. Evaluation of the cytoarchitectonics of the large pyramidal cells of layer V showed no significant changes in the dendritic spikes in the right or left hemisphere. Similarly, there were no significant changes in the spikes of basal and apical dendrites passing through layers I and II. The most profound changes were seen in layers III and IV: the number of dendritic spikes increased by 21 and 26 percent. These changes were taken as evidence of positive effects of space flight within a normal physiological range, as they did not exceed the changes seen in a number of other situations. Tables 1; references 11: 6 Russian, 5 Western.

Effects of Space Flight on Ultrastructural Features of Myoneural Junctions

18400077f Moscow BYULLETEN
EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 105 No 6, Jun 88 (manuscript received 8 Jun 87) pp 752-755

[Article by O. M. Pozdnyakov, L. L. Babakova, M. S. Demorzhii and Ye. I. Ilyina-Kakuyeva, Scientific Research Institute of General Pathology and Pathologic Physiology, USSR Academy of Medical Sciences; Institute of Biomedical Problems, Ministry of Health, Moscow]

[Abstract] An ultrastructural analysis was conducted on the effects of a 7 day space flight aboard the biosputnik Kosmos-1667 on the myoneural junctions of the soleus, gastrocnemius, and diaphragmatic muscles of Wistar-SPF rats. The animals were sacrificed 4-8 h after landing and subjected to conventional fixation procedures for electron microscopy. The changes that were observed were indicative of degeneration and regeneration, and were most pronounced in the soleus muscle. The changes were less pronounced in the gastrocnemius and minimal in the diaphragm. These changes were reflective of the degree of disuse of a particular muscle in flight and, for that reason, were deemed to be entirely reversible. Figures 1; references 5: 3 Russian, 2 Western.

UDC 633.11:575.224

**Valuable Forms of Soft Spring and Winter Wheat
Obtained by Chemical Mutagenesis in
Nonchernozem Area**

*18400099b Moscow SELSKOKHOZYAYSTVENNAYA
BIOLOGIYA in Russian No 4, Jul-Aug 88 (manuscript
received 21 Apr 87) pp 78-82*

[Article by M. N. Tokhver, Institute of Experimental
Biology, Estonian SSR Academy of Sciences, Kharku]

[Abstract] A summary is presented of the results of
studies in the nonchernozem area on the use of various

chemical mutagens for the production of valuable novel
forms of soft spring and winter wheat. The mutagens
consisted largely of nitrosomethylurea, nitrosoethylurea,
dimethyl sulfate, 1,4-bisdiazoacetylbutane, and nitroso-
dimethylurea. Multiple correlation analyses on the
resultant plants dealt with plant height, grain protein
content, grain weight, seed counts, maturation time, etc.
Tabulated data on the mutant strains showed that in
many cases their productivity was dependent on the
climatic conditions, and that in many cases mutant
plants show promise for use in breeding programs.
References 26: 21 Russian, 5 Western.

UDC 577.21

Plasmids Bearing Novel Variants of E. Coli lacZ Gene

18400061b Moscow BIOORGANICHESKAYA
KHIMIYA in Russian Vol 14 No 4, Apr 88 (manuscript
received 27 Jan 87; in final form 31 Aug 87) pp 478-483

[Article by Yu. Ye. Khudyakov, T. I. Kalinina, V. C. Neptyuyeva and V. D. Smirnov, Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow]

[Abstract] Restriction analysis of plasmid pCL471, bearing phage lambda promoter P_R controlling the hybrid gene cro-lacIZ responsible for expression of beta-galactosidase in E. coli, led to the identification of a series of mini plasmids with spontaneous deletions. The mini plasmids showed extended deletions of DNA representing ca. 60 percent hybrid cro-lacIZ gene. Despite the deletion of 1.8 to 2 tbp in the N-end of the lacZ gene, the plasmids transformed E. Coli cells and led the synthesis of beta-galactosidase. These observations suggest that mini plasmids with an incomplete lacZ gene may be used for the construction of novel vectors for purposes of genetic engineering. Figures 2; references 18: 3 Russian, 15 Western.

UDC 577.152.199

Effects of Temperature of Luciferase Activities of Beneckea Harveyi and Photobacterium Fischeri

18400076a Moscow BIOKHIMIYA in Russian
Vol 53 No 6, Jun 88 (manuscript received 10 Feb 87)
pp 891-898

[Article by G. N. Sakharov, A. D. Ismailov and V. S. Danilov, Chair of Microbiology, Biological Faculty, Moscow State University]

[Abstract] Comparative studies were conducted on the effects of temperature on the activities of luciferase preparations, isolated from Beneckea harveyi and Photobacterium fischeri, over a range of 2 to 27 degrees C. Evaluation of Arrhenius plots for reactions involving oxidation of endogenous aldehyde and exogenous aldehyde substrates showed an inflection point at 14-16 degrees C for the B. harveyi enzyme and the 9-11 degrees C for the P. fischeri enzyme. The form of plots obtained with the endogenous substrate differed, however, from those obtained with the exogenous substrates tetradecanal or (E)-9-hexadecanal. Evaluation of the activation thermodynamics for both species of luciferase revealed that the differences in the enthalpies of activation below and above the point of inflection differed by 6 kcal/mole for the B. harveyi enzyme and by 30 kcal/mole for the P. fischeri luciferase for both the endogenous and the exogenous substrates. The inflection points were interpreted to reflect a change in the conformational status of the enzymes. In addition, both enzymes were activated by phospholipase A2. The latter observations suggests

the presence of a lipid component in the luciferase preparations that may determine the active conformation of the enzyme for binding the aldehyde substrate and may represent a 'natural aldehyde factor' need for enzyme activity. Figures 4; tables 1; references 24: 6 Russian, 18 Western.

UDC 577.152.1

Effects of Decylamine and Bacterial Luciferase Activity

18400076b Moscow BIOKHIMIYA in Russian
Vol 53 No 6, Jun 88 (manuscript received 31 Mar 87)
pp 912-917

[Article by A. Yu. Sobolev and V. S. Danilov, Chair of Microbiology, Moscow State University]

[Abstract] The effects of decylamine on the activity of Beneckea harveyi 392 luciferase were investigated to determine the mechanism by which substrates and inhibitors are bound to the active site. Studies with bacterial preparations and isolated luciferase demonstrated that decylamine behaves as an inhibitor. The inhibition is of mixed type with the substrates decanal, with $K_i = 0.5$ gmM and $K_i = 3.3$ μ M. The inhibition constant with respect to FMN was $K_i = 2$ μ M and was noncompetitive in nature. Comparison of the Michaelis constants for decanal ($K_m = 30$ μ M) and for decylamine ($K_m = 0.5$ μ M) indicated that the affinity of the enzyme for the inhibitor was 60-fold greater than for the substrate. The binding mechanism for both the substrates and the inhibitor appears to involve hydrophobic forces as well as cysteine moiety in the active site of the enzyme. In the latter case electrostatic interaction is proposed for the $NH^+/3$ of decylamine and a protonated SH^- or S^- on the enzyme, and the formation of a covalent intermediate between the carbonyl group of the aldehyde and the cysteine. Figures 5; references 27: 9 Russian, 18 Western.

UDC 577.112

Limited Proteolysis of Brain-Specific S100 Proteins: Isolation and Physicochemical and Immunochemical Characterization of Neuropeptide AT-1-1

18400076c Moscow BIOKHIMIYA in Russian
Vol 53 No 6, Jun 88 (manuscript received 19 May 87)
pp 985-990

[Article by A. B. Poletayev, Z. I. Storozheva, M. A. Gruden, I. I. Babichenko and V. V. Shertnev, Institute of Normal Physiology imeni P. K. Anokhin, USSR Academy of Medical Sciences, Moscow]

[Abstract] Conventional separation and isolation techniques employed in protein chemistry were used to isolate four peptides from the bovine brain representing proteolytic products of the brain-specific protein S100. Additional chromatography on TSK HW-40 column led

to the isolation of 6 individual peptides, one of which—AT-1-1—was subjected to further studies. AT-1-1 (2300-2500 d) in a concentration of 10^{-12} M inhibited by 70 percent the binding of specific ligands to benzodiazepine receptors of the brain. In higher concentrations (10^{-9} to 10^{-3} M) AT-1-1 inhibited the binding of endogenous substrates to dopaminergic, serotonin, and m-cholinergic receptors. Immunohistochemical techniques employing rabbit antisera against AT-1-1 revealed the presence of AT-1-1-like peptides in the astrocytes of the rat brain and in the ganglia of the common snail. ELISA studies demonstrated that AT-1-1 was not identical to a battery of 14 commercially-available endogenous peptides. The data supported the view that in the process of S100 metabolism peptides are formed that seem to modulate the activity of benzodiazepine receptors in the CNS. Tables 2; references 19: 5 Russian, 14 Western

UDC 577.152.3

Purification and Properties of Two Catechol-2,3-Dioxygenases Under Control of Biphenyl Degradation Plasmid pBS241 Derived from *Pseudomonas putida*

18400076d Moscow BIOKHIMIYA in Russian
Vol 53 No 6, Jun 88 (manuscript received 3 Jun 87)
pp 1040-1047

[Article by S. A. Selifonov, I. I. Starovoytov and G. K. Skryabin, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino, Moscow Oblast]

[Abstract] An analysis was conducted on two enzymes involved in the biodegradation of biphenyl, isolated from *Pseudomonas putida* BS893. The enzymes (metapyrocatechases (MPC), catechol-2,3-Dioxygenase, EC 1.13.11.2) were established to be under the control of plasmid pBS241. Studies on MCP-1 showed that it had a MW of 135 kd and consisted of 34 and 22.5 kd subunits, apparently in a $\alpha_2\beta_2$ -type heterotetramer arrangement. MCP-1 activity is optimum at pH 8.0 and 54 degrees C, and has a pI of 5.15. MPC-2 was shown to have a MW of 154 kd and consists of identical subunits with MW of 41 kd forming a homotetramer (α_4). The pI of MPC-2 is 4.95, with optimum activity at pH 7.5 and 60 degrees C. Determinations of kinetic parameters for various catechol derivatives showed that MPC-1 had a high affinity for 2,3-dihydroxybiphenyl, showing weak activity with respect to 3-methylcatechol and none with 4-methylcatechol. MPC-2 was inactive with respect to 2,3-dihydroxybiphenyl and displayed moderate cleaving activities with respect to 3- and 4-methylcatechols. In the bacterial milieu the two enzymes are subject to different regulatory mechanisms, as evidenced by the fact that their peak activities occur on different portions of the growth curve. Figures 4; tables 3; reference 20: 6 Russian, 14 Western.

UDC 615.357:577.175.343].012.1

Synthesis and Biological Activity of C-Terminal Fragments of Vasopressin

18400080a Moscow
KHIMIKO-FARMATSEVTICHESKIY ZHURNAL
in Russian Vol 22 No 6, Jun 88 (manuscript received 5 Feb 87) pp 675-679

[Article by V. P. Golubovich, V. P. Martinovich, A. B. Usenko, L. K. Slobodchikova, S. A. Titov and I. P. Ashmarin, Institute of Bioorganic Chemistry, Belorussian SSR Academy of Sciences; Biology Faculty, Moscow State University]

[Abstract] Technical details are presented on the synthesis of the C-terminal peptides of vasopressin Cys-Pro-Arg-Gly-amide (CPRGa) and Cys-Pro-Arg (CPR), employing methods minimizing the use of protective groups in the course of synthesis. Both agents were tested for behavioral effects in outbred 150-200 g rats. CPR, even in doses exceeding 30-fold the effective vasopressin dose, had no effect on rat behavior. CPRGa, administered intraperitoneally in a dose of 0.01 mg/kg, did not affect motor activity; however, an hour later, searching behavior increased with a concomitant increase in grooming behavior. CPRGa, likewise, had no effect on conditioned avoidance response. Nevertheless, in animals treated with haloperidol (0.6 mg/kg), the avoidance response was suppressed, but corrected if haloperidol and CPRGa were administered simultaneously. In view of the fact that under certain conditions CPRGa may correct haloperidol-induced learning disabilities and lacks the negative impact on motor activity displayed by vasopressin, it appears that CPRGa should be investigated for potential therapeutic applications. Figures 1; references 6: 4 Russian, 2 Western.

UDC 577.352.5

Induction of Spontaneous Release of Mediator by Crown Esters

18400087 Moscow BIOLOGICHESKIYE MEMBRANY
in Russian Vol 5 No 6, Jun 88 (manuscript received 8 Dec 86) pp 643-647

[Article by U. Z. Mirkhodzhayev, D. Kalikulov, P. B. Usmanov and A. K. Tashmukhamedova, Tashkent State University imeni V. I. Lenin]

[Abstract] Experimental results are reported from a study of crown ester effect on neuro-muscular transmission in frog muscle at 22-24 degrees C. Several compounds were evaluated on biological and synthetic membranes: an inducer of calcium transmission 4', 4'' (5'') diacyl derivatives of dibenzo-18-crown-6 (DB18K6) and structural isomers of the inducer of magnesium transmission, di-sec-butyl-DB18K6. It was shown that addition of crown esters led to a change in the frequency of miniature end-plate potential (MEPP) after a latent period; this appeared to be a function of the concentration

of added material. Average value of the amplitude of MEPP did not change. In a Ca^{2+} free medium, the calcium transmission inducers failed to alter the frequency of MEPP; conversely in Mg^{2+} free medium, the magnesium transmission inducers failed also. Diheptanoyl-dipropionyl- and didecanoyl DB18K6 changed Ca^{2+} transmission to a lesser degree than dioctanoyl- and dibutyryl- DB18K6 leading to a conclusion that the

frequency increase of MEPP is a direct function of the degree of ionophoric action of diacyl derivatives of DB18K6. The role of calcium ions in secretion of transmitters could be performed by other cations (Mg, Ba, La). Their effectiveness in this, depends on their ability to penetrate the presynaptic membrane. Figures 2; references 14: 11 Russian (1 by Western authors), 3 Western (1 by Russian authors).

Conformational Relaxation of Bacterial Luciferase in Relation to

18400060a Moscow BIOFIZIKA in Russian
Vol 33 No 3, May-Jun 88 (manuscript received
19 Nov 85; in final form 5 May 87) pp 396-400

[Article by N. S. Rodionova, V. N. Petushkov and P. I. Belobrov, Institute of Biophysics, Siberian Department, USSR Academy of Sciences, Krasnoyarsk]

[Abstract] An analysis was conducted on the relaxation kinetics of bacterial luciferase in order to define the physical parameters that enable the enzyme to differentiate between aldehyde substrates on the basis of the carbon-chain length. The enzymes (luciferase and reductase) were isolated from *Vibrio harveyi* B-392 and employed with the substrates decyl (C-10), lauryl (C-12), and myristyl (C-14) aldehydes. Determination of luminescence kinetics in 0.1 M Na-phosphate buffer, pH 7.0, with the luciferase reaction initiated by the addition of photochemically reduced FMN (FMN.H_2), showed an essentially equivalent quantum yield of photons with the C-10, C-12, and C-14. However, the Michaelis constants showed significant variations (C-10 = 3.2×10^8 M; C-12 = 0.9×10^8 M; C-14 = 1.5×10^8 M), as did, of course, the i_{max} and k (sec^{-1}) parameters. The difference in the luciferase behavior with C-12 as opposed to C-10 and C-14 has not been seen with luciferase derived from other bacteria, and appears to reflect unique stereospecific characteristics of the active center of *V. harveyi* luciferase with respect to C-12. In the in vitro systems with two substrates, distinct inflection points were seen on time vs. luminescence intensity plots in C-10 + C-12 + C-14 combinations, but not with the C-10 + C-14 combination. Assessment of the relaxation processes in luciferase switching from one substrate to another was conducted with a two-enzyme system (luciferase + reductase) relying on coupling of NADH and FMN. The data were suggestive of the fact that switching from one substrate to another in this system involved rearrangement of enzyme-substrate complexes of the type predicted by the relaxation theory of enzymatic catalysis. However, the exclusion of other possible explanations would require definitive spectral and chemical studies of conformational changes in luciferase. Figures 3; references 10: 2 Russian, 8 Western.

UDC 591.4

Reconstruction of Purified and Functional Dihydropyridine-Sensitive Calcium Channel in Liposomes

18400078b Moscow DOKLADY AKADEMII NAUK
SSSR in Russian Vol 301 No 6, Aug 88 (manuscript
received 7 Jan 88) pp 1505-1507

[Article by P. G. Kostyuk, academician, O. M. Rozhmanova, L. N. Stelmakh, S. G. Voronina and N. M. Soldatov, Institute of Physiology imeni A. A. Bogomolets, Ukrainian SSR Academy of Sciences, Kiev; Institute of biomedical Technology, Moscow]

[Abstract] Studies were conducted on the reconstruction and functional characteristics of dihydropyridine

(DHP)-sensitive Ca channels in liposomes, with DHP receptors isolated from rabbit skeletal muscles. The liposomes were prepared from dimyristoylphosphatidylcholine and phosphatidylserine in the conventional manner, with incorporation of the DHP receptor (consisting of 2 subunits, P-160 and P-53). Electrophysiological studies demonstrated that liposomes lacking the receptor complex were poorly permeable to Ca ions, with the permeability parameters unaffected by nitrendipine, D-600, or VAU K-8644 (known Ca channel-active agents). However, liposomes containing the reconstituted DHP receptors showed 2- to 8-fold greater permeability to the Ca ions. Furthermore, in the latter case, Ca permeability was diminished to 67.2 percent of the control value by 10^{-7} M nitrendipine and to 58.6 percent by 10^{-6} M D-600, known inhibitors of Ca channels. Treatment with VAU K-8644, a known Ca channel activator, did not enhance Ca transport. These observations confirmed the fact that the DHP complex represents DHP-sensitive Ca channels. Further definition of this particular channel shall be derived from voltage-clamp studies. Figures 2; references 6: 1 Russian, 5 Western.

UDC 577.3

Photoactive Complex of Secondary Photosystem From *Anacystis Nidulans* R2

18400086 Moscow DOKLADY AKADEMII NAUK
SSSR in Russian Vol 301 No 4, Aug 88 (manuscript
received 28 Jan 88) pp 993-997

[Article by B. A. Gulyayev, V. M. Golitsyn, V. L. Tetenkin, Moscow State University imeni M. V. Lomonosov]

[Abstract] An attempt was made to isolate the photoactive complex FS-2 from the membranes of cyanobacteria *Anacystis nidulans* R2, to evaluate this preparation by a combination of spectral and photochemical tests and to investigate the specificity of the organization of its antenna apparatus. Fluorescence spectra of characteristic low temperature bands F686 and F696 of the isolated F-2 complex (KSF-2) were superimposable with spectra of photosynthetic membranes in the absorption range of chlorophyll a, showing that the structure of the pigment apparatus was native. It did not seem reasonable that all molecules of chlorophyll a in KFS-2 composition would form only a single exciton during excitation. More likely, the structure of chlorophyll antenna in KFS-2 is formed by pigment clusters containing 4-5 molecules of chlorophyll a: 2 clusters in each subunit (40 and 47 kD) and one central cluster representing the reactive center of FS-2 localized in protein D1-D2 dimer, 32 kD each. One betacarotene molecule is evidently connected to each cluster playing the role of an effective quencher of the triplet states. The molecules are separated by 10-12 in the cluster. Experimentally determined spectra and kinetics of photofading based on spectrophotometric data supported this conclusion. Figures 3; references 14: 4 Russian, 10 Western.

UDC 577.352.465

Interaction of Calmodulin Antagonists with Calcium Channels

18400088 Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 5 No 7, Jul 88 (manuscript received 10 Feb 88) pp 688-697

[Article by P. A. Doroshenko, P. G. Kostyuk, and Ye. A. Lukyanets, Institute of Physiology imeni A. A. Bogomolets, UkSSR Academy of Sciences, Kiev]

[Abstract] The goal of this work was to study mechanisms of the interaction of calmodulin antagonists chlorpromazine, trifluoroperazine and calmidazolium with calcium channels and to look for participation of intercellular calcium in the blocking process. The methodology used included fixation of membrane potential during intercellular perfusion of isolated nerve cells of the CNS of the snail *Helix pomatia*. The most obvious result of extracellular action of calmodulin antagonist was the concentration-dependent changes in peak values of calcium entering current. All the compounds studied blocked calcium current at concentrations of 10-100 μ M. Blocking efficiency did not depend on the nature of the current carrying cation (Ca or Ba) nor on the intracellular perfusion solution of 10 mM EGTA. At a 10 μ M concentration, calmodulin antagonists potentiated blocking of Ca channels by Co^{2+} and Cd^{2+} ion. In submicromolar concentration, calmodulin antagonists stimulated an increase of calcium current to 120 percent; this did not change when pH was elevated to 8.1. A model was proposed for these observations suggesting two binding sites in calcium channel which upon binding to above antagonists modulate the channel affinity for

penetrating cations thereby altering current amplitude. Figures 5; references 35: 6 Russian (1 by Western authors), 29 Western (8 by Russian authors).

UDC 581.143.6

Study of Cell Population Growth of Different Wheats and of Goat's Eye (*Aegilops*) in Suspension Culture

18400098 Alma-Ata VESTNIK AKADEMII NAUK KAZAKHSKOY SSR in Russian No 8, Aug 88 pp 66-70

[Article by Zh. K. Dzhardemaliyev, I. D. Nikiforova, R. G. Butenko, M. K. Karabayev and M. A. Aytkhozin (deceased)]

[Abstract] The goal of this work was to introduce wheat and *Aegilops* cells into a suspension culture in order to optimize conditions for their propagation and to evaluate their morphogenetic potential. Following were the wheat sorts studied: *Tr. aestivum*, hexaploid, soft wheat, Dneprovskaya 261 brand; *Tr. durum* tetraploid, hard wheat, brand 8043; *Tr. timofeevi*, tetraploid, wild form; and *Aegilops Ae. cylindrica*, diploid. It was shown that the rate of cell division is a function of the genotype: the wild form wheat and *Aegilops* cells multiplied much better than the other forms in all media studied. Microscopic analysis of the suspension culture showed a heterogeneous composition of the cells: along with parenchymal cell types, meristemoid cells were observed. It was also shown that callus tissue could also be grown on solid medium. Thus it is possible to use suspension cultures in selection of cereal grasses. Figures 2; references 4: 1 Russian, 3 Western

UDC 633.112.1:581.143.6

Callus Formation and Plant Regeneration from Immature Embryos of Hard Spring Wheat
18400099a Moscow SELSKOKHOZYAYSTVENNAYA NAUKA in Russian No 4, Jul-Aug 88 (manuscript received 5 Aug 87) pp 65-58

[Article by I. F. Shayakhmetov, F. K. Ishtiryakova and M. M. Khabirova, Department of Biochemistry and Cytochemistry, Bashkir Branch, USSR Academy of Sciences, Ufa]

[Abstract] A study was conducted on 12 varieties and breeds of hard spring wheat to assess their potential for

callus formation and plant regeneration from immature embryos under tissue culture conditions. The rate of success was found to vary from 8 to 93 percent, with the lines H-112-40 and Senator Capelli standing in the forefront. However, the failure of other wheat varieties may have been due to the culture conditions employed. Greenhouse and field trials led to the identification of somaclonal variants. The latter, however, were generally less productive than the parental strains. Nevertheless, the fact that Kharkov-46 and H-112-40 varieties produced some highly productive somaclonal variants suggests their potential usefulness in studies on the physiology and biochemistry of somaclonal variability and their genetic stability. References 14: 8 Russian, 6 Western.

Measures Taken To Improve Ecological Situation in Azerbaijan

18400071 Baku BAKINSKIY RABOCHIY in Russian
4 Sep 88 p 2

[Azerinform article: "To Tighten Control Over Pesticide Use"]

[Text] In Azerbaijan, the use of highly toxic pesticides in agriculture has decreased somewhat over the past few years, and medical monitoring of their use has become more strict. As previously, however, the unsatisfactory organization of operations involving toxic chemicals is cause for alarm because of the very serious effects on the health of fieldhands and on the overall ecological conditions in the republic. This problem was the object of examination at the meeting of the Presidium of the AzSSSR Council of Ministers. Ministry and departmental administrators and personnel from scientific institutions of the Academy of Sciences and Gosagroprom, rayon medical and epidemiological stations, rayon agrochemical associations [rayselkhozkhimii], and rayon agroindustrial associations [RAPO] participated in the meeting.

The discussion showed that the directors of Gosagroprom, the Ministry of Health, the AzSSSR Agrochemical Association [Azerselkhozkhimiya], their local organs, and the Soviet of People's Deputies are slowly reorganizing their operation in this direction in light of current needs. Although biological and microbiological plant protectants are being used more widely throughout the republic, the absence of appropriate monitoring has resulted in a situation where a large quantity of preparations are losing their effectiveness because they are not used in time. In most farms chemical herbicides and pesticides are stored out in the open or in locations that have not been specially adapted for them. They are carried away by the wind and washed away by the rain,

thus polluting the environment. The situation regarding the disposal and burial of pesticides that have expired or whose use has been forbidden is unsatisfactory.

On many farms, primarily in the Zhdanovskiy, Agdamskiy, Zardobskiy, Mir-Bashirskiy, Bardinskiy, Udzharskiy, Agdzhabedinskiy, Tauzskiy, and Dubinskiy rayons, the continuous treatment of crops with pesticides persists without justification. Those working in the Ministry of Health and the State Committee for the Environment are not exercising their rights and authority with regard to strict control over the storage, transport, and use of chemical herbicides and pesticides.

After noting the unsatisfactory operation of the aforementioned ministries, departments, and their local organs, the Presidium of the AzSSSR Council of Ministers required their directors to take decisive measures to eliminate the existing shortcomings. Special attention was paid to the introduction of scientifically based, integrated plant protection methods, to the use primarily of a ground-based method to fight pests, to the improvement of the agricultural technology used in cultivating crops, and to the acceleration of the construction both of standardized on-farm facilities for storing pesticides and of biological laboratories. Allocation of chemical plant-protectants to the public for personal use has been prohibited. The Ministry of Health and AzSSSR Gosplan have been charged with preparing proposals regarding the problem of organizing an affiliate of the All-Union Hygiene and Toxicology of Pesticides, Polymers, and Plastics Scientific Research Institute in Baku.

The Commission on Environmental Protection of the Presidium of the AzSSSR Council of Ministers will monitor the implementation of the specified measures.

G. N. Seidov, chairman of the AzSSSR Council of Ministers, spoke at the meeting.

UDC 578.828.6;577.215

Cloning and Expression of HIV-1 Reverse Transcriptase Gene in Escherichia Coli

18400078a Moscow DOKLADY AKADEMII NAUK
SSSR in Russian Vol 301 No 6, Aug 88 (manuscript
received 22 Dec 87) pp 1493-1496

[Article by A. A. Melnikov, T. N. Kopylova-Sviridova, Yu.P. Shvetsov, S. A. Seregina, A. V. Kaliman and I. I. Fodor, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino, Moscow Oblast]

[Abstract] Conventional genetic engineering techniques were employed for the cloning and expression of the reverse transcriptase (RT) gene of the HIV-1 virus in *E. coli*. The steps included the construction of three recombinant plasmids bearing the RT gene sequence that were effective in inducing expression of HIV-1 RT activity in the bacterial system. Detailed studies on one of the recombinant RT coded by plasmid pRT17, involving ion-exchange and affinity chromatography on DEAE- and phospho- and Heparin-cellulose columns, yielded a nuclease-free RT preparation. The RT preparation retained its activity for 50 min at 37 degrees C, and consisted of three fractions (50 kd, 85 kd, and 105 kd) upon SDS electrophoresis. The electrophoretic mobility of these components was identical and their formation was attributed to protease action. Figures 3; references 13: 1 Russian, 12 Western.

UDC 575.224

Significance of RS1 Sequence of Cholera Vibrio in Amplification of Plasmid DNA Segment Bearing Tetracycline Resistance Gene and Cholera Toxin Genes

18400089a Moscow GENETIKA in Russian
Vol 24 No 5, May 88

[Article by S. L. Filkova, T. S. Ilyina, A. L. Gintsburg, N. V. Yanishevskiy and G. B. Smirnov, Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

[Abstract] *E. coli* K-12 clones, bearing the hybrid plasmid pC0107, were isolated that demonstrated enhanced resistance to tetracycline that exceeded the parental strain 4- to 30-fold, equivalent to tolerance to tetracycline concentrations reaching 300 µg/ml. pC0107 was constructed from the F-factor pOX38 and plasmid

pBR322-derived pCT105. pCT105 represents a unique entity bearing, in addition to the Tc^r gene, the vctA and vctB cholera toxin genes. Within pC0107 the fused pCT105 and pOX38 replicons are flanked by direct RS1 repeat. Restriction analyses and Southern blotting experiments led to the conclusion that the enhanced tetracycline resistance was due to amplification of the pCT105 component of pC0107, and that the amplification was attributable to the flanking RS1 sequences. As expected, the amplification of pCT105 was also accompanied by enhanced production of cholera toxin, representing a 20-fold increase from 12 to 230 µg/liter. The latter suggests that the form of amplification observed in this study may be a putative mechanism responsible for increased virulence of some *Vibrio cholerae* strains. Figures 5; references 18: 4 Russian, 14 Western.

UDC 577.2

Cloning and Localization of Replication and Mobilization Sites of Pseudomonas Putida Plasmid pBS286

18400089b Moscow GENETIKA in Russian
Vol 24 No 6, Jun 88 (manuscript received 20 May 87;
in final form 21 Aug 87) pp 980-992

[Article by T. V. Tsoy, L. K. Gribova, I. A. Kosheleva and A. M. Boronin, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino, Moscow Oblast]

[Abstract] Studies were conducted on the analysis and cloning of the rep-mob sites of the *Pseudomonas putida* plasmid pBS286, a broad host range biodegradative plasmid belonging to incompatibility group IncP-9. Cloning of these sites imported to *E. coli* plasmids pUC19 and pBR322 the capacity for efficient mobilization and maintenance in gram negative bacteria other than *E. coli*. In addition, these sequences also imparted to recombinant plasmids pBS952 and pBS953 the incompatibility characteristics of pBS286 replicon. The cloning of the rep-mob sites in plasmids pBS952 and pBS953 shows that broad host range vectors may be constructed that are compatible with broad host range vectors derived from incompatibility groups IncP-1 and IncP-4. The rep- and mob sites on pBS286 were mapped in the 'conservative' region of the genome occupying position 54.5-73 tpb on the genetic map. The mapping data were in agreement with information derived from plasmids pBS950 and pBS951, representing mini plasmids derived from pBS286 and pBS292 in the course of *E. coli* HB101 (recA) transformation. Figures 4; references 26: 9 Russian, 17 Western.

UDC 616-092:612.017.1-064]-092.9-02:547.532]-
085.357.631

**Anabol Correction of Benzene-Induced
Immunodeficiency**

18400063f Moscow BYULLETEN
EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 105 No 4, Apr 88 (manuscript received
1 Dec 86) pp 457-459

[Article by A. V. Karaulov, V. I. Ogarkov, Yu. I. Khromenkov and V. N. Frash, All-Union Scientific Research Institute of Biotechnology, Moscow]

[Abstract] Trials were conducted with the efficacy of anabol (lactostimulin), a Soviet immunomodulating agent, in reversing benzene-induced immunosuppression. Immunosuppression was attained by treating C57B1/10 mice with subcutaneous 2 ml/kg benzene daily (5 times/week) for 6 months. Two weeks before benzene administration was discontinued, experimental mice were started on intragastric administration of 25 mg/kg/day anabol. Long-term benzene administration led to hypoplasia of the hemopoietic system and persistent immunodeficiency affecting both cellular and humoral immunity. Assessment of lymphocytes from mice with chronic benzene toxicity showed compromised ability to metabolize xenobiotics on the basis of depressed activities of cytochrome P-450, cytochrome C reductase, and of glutathione-S-transferase. Anabol administration for 2 weeks led to virtually complete reversal of the negative effects of benzene on cellular immunity and partial recovery of humoral immunity, as well as partial elevation of lymphocytic enzymes involved in xenobiotic metabolism. These studies confirmed previous clinical impressions about the beneficial effects of anabol in patients with severe pneumonia. References 15: 10 Russian, 5 Western.

UDC 616.127-002-022:578.835.17]-085.276.4-036.8

**Effects of T-Activin on Experimental Viral
Myocarditis**

18400077b Moscow BYULLETEN
EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 105 No 6, Jun 88 (manuscript received
25 Dec 87) pp 705-707

[Article by N. N. Kipshidze, M. M. Dzhasharidze, R.V. Bulusashvili, A. V. Khuchua and N. A. Zvizdazde, Institutes of Experimental and Clinical Therapy and of Experimental and Clinical Surgery, Georgian SSR Ministry of Health, Tbilisi]

[Abstract] Experimental therapeutic trials were conducted with T-activin to assess the effects of this immunomodulator on the course of viral myocarditis. The experimental model consisted of 2 month old (16-20 g) male and female BALB/c mice injected intraperitoneally with Cocksackie B₁ virus, with experimental animals treated on the 5th day with 0.01 mg/kg T-activin and for

5 days thereafter. The animals were monitored for their immune status, survival rate, and histopathologic and ultrastructural changes in the heart. Evaluation of rosette-formation tests showed that in control infected mice both total lymphocytes and T-cells were depressed as a result of the viral challenge, whereas in T-activin-treated mice both parameters were elevated. Furthermore, by day 30 none of the T-activin mice had succumbed, while 12 of the 64 untreated mice had been lost. Evaluation of the heart demonstrated that T-activin mitigated the severity of dystrophic and necrotic changes in the myocardium, although the ratio of heart weight to body weight was increased in both the control and experimental mice to the same extent and unaccompanied by changes in the EKG. On balance, the findings obtained with the BALB/c mice pointed to a beneficial role of T-activin in viral myocarditis. Figures 2; tables 2; references 15: 1 Russian, 4 Western.

UDC 615.371:579.843.95]-015.44.079.6

**Histopathologic Changes Induced by EV Plague
Vaccine in Inbred Mice**

18400077g Moscow BYULLETEN
EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 105 No 6, Jun 88 (manuscript received
12 Mar 87) pp 761-764

[Article by L. S. Nazarova, I. V. Isupov, L.P. Pavlova, A. V. Gorkova, V.A. Dushkin and T. I. Zaytsev, All-Union Scientific Research Anti plague Institute "Mikrob," Saratov; Laboratory of Experimental Biological Models, USSR Academy of Medical Sciences, Moscow]

[Abstract] The EV plague vaccine is known to possess sufficient virulence to induce histopathologic changes in the internal organs of immunized animals. To define the spectrum of activity in relation of the genotype of a target animal, trials and histopathologic studies were conducted on four inbred lines of mice. The experimental mice consisted of the following haplotypes: H-2^k (CBA/LacJ), H-2^a (A/SnJ), H-2^d (BALB/cJ), and H-2^b (C57B1/6J, CC57W/J, B10CW/J). With the exception of the B10CW line, the lines were represented by female animals. The mice were injected subcutaneously with the EV plague microbes in a dose of 5×10^3 or 10^5 cells, the former representing the minimum immunizing dose and the latter ensuring the highest levels of immune protection. Evaluation of the histopathologic changes in the heart, lungs, liver, spleen, kidneys, adrenals, and the thymus were monitored on days 1, 3, 5, 7, and 13. The data showed that susceptibility to the adverse effects of the EV vaccine were under genetic control, and varied considerably according to the haplotype. The H-2^k and H-2^a haplotypes sustained the least damage to the internal organs and showed the least decrease in splenic enzymatic activity. Animals of the H-2^d and H-2^a haplotypes were much more susceptible to damage. The CBA mice were determined to show the greatest degree of resistance, while the C57B1/6 mice were the most susceptible. The practical use of such lines is in studies

attempting to define factors predisposing to undue susceptibility to microbial agents and in assessing residual virulence of vaccine strains. Figures 3; reference 7 (Russian).

UDC 615.371:579.841.93].012

Immunogenicity of Synthetic Brucella Antigens
18400081b Moscow *ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian* No 7, Jul 88 (manuscript received 9 Mar 87) pp 39-43

[Article by R. V. Petrov, R. M. Khaitov, P. I. Ignatov, A. V. Nekrosov, B. D. Sviridov, A. I. Fedorov, D. A. Goryainov, V. V. Sochnev and G. I. Grigoryeva, Institute of Immunology, USSR Ministry of Health, Moscow]

[Abstract] Trials were conducted with synthetic brucella antigens prepared by covalent conjugation of *Brucella abortus* 54-derived antigen lacking a lipopolysaccharide component with either high-molecular weight dextran or N-vinylpyrrolidone (100,000 d). Intramuscular injections of 300-400 g guinea pigs were employed for testing immunogenicity, with the results showing that the conjugated preparations were much more immunogenic and protective than the unconjugated antigen. Furthermore, conjugates prepared with dextran offered superior protection against brucellosis than vaccines based on conjugation with N-vinylpyrrolidone. In addition, the antibodies generated by immunization with the conjugated vaccines did not interfere with routine clinical serologies used for purposes of diagnosis, since the diagnostic tests rely on antibodies against the lipopolysaccharide antigen. Tables 2; references 8: 6 Russian, 2 Western.

UDC 576.8.093.2+616-036.2

Possibilities of Using Immunomodulator Tactivin to Enhance Postvaccinal Change
18400085a Kishinev *ZDRAVOOKHRANENIYE in Russian* No 3, May-Jun 88 (manuscript received 3 Sep 87) pp 23-26

[Article by E. N. Shlyakhov and V. V. Gylka, Department of Epidemiology, Kishinev Medical Institute]

[Abstract] Guinea pig trials were conducted with tactivin, a Soviet immunomodulator, to assess its effects on the course of immunological sequelae following immunized subcutaneously with 40×10^6 spores of a nonencapsulated strain, with the experimental animals also treated with 25 µg/kg tactivin. Positive skin tests were

obtained in 15 percent of the experimental animals on the 3rd day following immunization, whereas the control guinea pigs treated with only the spores required 5 days for a positive skin test (12.5 percent positives). On day 7 the percentage of skin positive animals in the experimental and control groups were 81.3 and 66.7 percent, respectively. Assessment of survival rates after challenge with live anthrax on days 4, 6, and 8 yielded figures of 52.9, 68.7, and 80.0 percent for the control animals, and 90.0, 94.7, and 93.7 percent for the experimental animals. Challenge 180 days after immunization yielded survival figures of 43-50 percent for the control guinea pigs, and 76 to 81 percent for the experimental animals. The findings thus demonstrated that tactivin constitutes a potent immunomodulator capable of enhancing host resistance to pathogenic bacteria within days following its use in conjunction with an appropriate vaccine. Tables 3; references 10: 5 Russian, 5 Western.

UDC 616.98:579.842.14]-092:612.017.1]-07

Protective Properties of Myelopeptides in Development of Infectious Processes Induced by Salmonella Bacteria

18400090 Moscow *ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOLOGII in Russian* No 5, May 88 (manuscript received 3 May 87) pp 62-64

[Article by R. V. Petrov, V. S. Aprikyan, Yu. O. Sergeyev, S. I. Yelkina, V. V. Sergeyev and A. A. Mikhaylova, Institute of Immunology, USSR Ministry of Health; Central Scientific Research Institute of Vaccines and Sera imeni I. I. Mechnikov, USSR Ministry of Health, Moscow]

[Abstract] The goal of the study was to evaluate the protective action of myelopeptides during development of bacterial infection induced by *Salmonella choleraesuis* 1422 and 370, and *S. typhimurium* 415. Experiments were performed on (CBAXC57BL)F₁ and randomly-bred mice and on piglets of the white Ukrainian species. Administration of myelopeptides within 1-3 days after lethal infection with bacteria lowered mortality of experimental animals. When prophylactic administration of myelopeptides, 24 hrs prior to infection, was used, the results were even better. Finally, myelopeptides were shown to stimulate weight gain of the piglets infected with *S. Choleraesuis*. An assumption was expressed that myelopeptides intensify phagocytic activity of the macrophages, preventing development of parasitic *Salmonella* in the macrophages. References 7: 4 Russian (1 by Western author), 3 Western (2 by Russian authors).

Mechanism of Action of Low-Intensity 337 nm Laser Light on Neuronal Calcium Channels

18400060c Moscow BIOFIZIKA in Russian
Vol 33 No 3, May-Jun 88 (manuscript received
11 May 87) pp 525-527

[Article by Yu. N. Samko and V. I. Bogomolov, Scientific Research Institute of Normal Physiology imeni P. K. Anokhin, USSR Academy of Medical Sciences, Moscow]

[Abstract] Intracellular dialysis under voltage clamp conditions was employed to assess the effects of low-intensity (0.4 J/cm^2) 337 nm LGI-21 laser light on Helix neurons. Recordings obtained from four neurons showed that 337 nm laser illumination led to blockage of calcium channels without altering their voltage dependence. The latter indicated that the laser light affected the gating complex of the calcium channel, implicating thereby cis-trans isomerization of the carotenoid complex of the plasma membrane. The calcium channels remained closed during the 1 hour period of observation, indicating the inapplicability of this factor for calcium current regulation. Figures 2; references 14: 8 Russian, 6 Western.

UDC 616.33-002.44-085.849.19-036.8-07:616.33-018.73-003.9

Effects of Helium-Neon Laser on Gastric Mucosa

18400077e Moscow BYULLETEN
EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 105 No 6, Jun 88 (manuscript received
10 Jun 87) pp 750-752

[Article by I. M. Baybekov, E. Sh. Musayev and D. T. Alimov, Department of Pathologic Anatomy, Tashkent Branch, All-Union Scientific Surgical Center, USSR Academy of Medical Sciences]

[Abstract] The increasing clinical use of helium-neon lasers in the treatment of peptic ulcers led to an assessment of laser effects on the gastric mucosa in rats. The effects were studied by a variety of techniques (histologic, histochemical, autoradiographic, electron microscopy), with irradiation of a 3 mm diameter area in the fundus of male Wistar rats with increasing doses (6.78 to 33.9 J/cm^2 for 1-5 min). The net effect of helium-neon laser irradiation was an increase in secretory activity in direct relationship to the dose. Primary changes were noted in the immediate target area of the gastric mucosa, but less pronounced changes also affected adjacent tissue. With the highest dose tested (33.9 J/cm^2 for 5 min) microerosive changes in the gastric mucosa were also in evidence. Laser irradiation also induced proliferative changes in the gastric mucosa, exceeding by ca. 23 percent the background level in the case of the highest dose. Figures 2; references 5 (Russian).

UDC 615.849.19.03

Use of Carbon Dioxide Laser in Abdominal Surgery

18400083b Alma Ata ZDRAVOOKHRANENIYE
KAZAKHSTANA in Russian No 7, Jul 88 pp 49-51

[Article by S. O. Ordabekov, K. A. Usenov, Ye. T. Ibragimov and V. S. Kim, Surgical Department, Dzhambul Oblast Hospital]

[Abstract] A case study analysis was conducted on the use of a CO_2 laser scalpel in the management of various surgical conditions, in order to assess the frequency of complications. Beginning with 1982, a total of 384 patients underwent various CO_2 laser treatment modalities, with a frequency of complications of 2.34 percent (9 patients). Gastric resection accounted for 219 of the cases, 4 of which led to complications. Cholecystectomy, hydatidectomy, selective proximal vagotomy (with drainage), duodenal resection, gastroenterectomy, hemicolectomy, and resection of the liver were among the other procedures performed. Prevention of post-op complications involving hemorrhage, bile discharge, and suppuration was attributed to the use of the laser. The success with the laser (Skalpel-I instrument operating at 30 W, $10.6 \mu\text{m}$ wavelength) was felt to be due to its effectiveness as a resection tool, as well as to the bactericidal and hemostatic effects of the laser-beam.

UDC 616.127-005.8-036.11-06:12-008.318-085.849.19-036.8-073.97

24-Hour Holter Monitoring of Antiarrhythmic Intracardiac Laser Therapy in Acute Myocardial Infarction

18400091a Moscow KARDIOLOGIYA in Russian
Vol 28 No 7, Jul 88 (manuscript received 24 Apr 87)
pp 60-63

[Article by N. N. Kipshidze, G. E. Chapidze, M. R. Bokhua, L. A. Marsagishvili, T. S. Revishvili and D. G. Eristavi, Scientific Research Institute of Experimental and Clinical Therapy, Georgian SSR Ministry of Health, Tbilisi]

[Abstract] Therapeutic trials were conducted on a group of 215 patients, male and female, (mean age 59.5 years) with acute myocardial infarction managed by, in addition to indicated conventional means, intracardiac laser therapy. The patients were divided into three experimental groups on the basis of frequency and type of arrhythmias, as well as a control group untreated by the laser. In the experimental groups, the right atrium was irradiated with a helium-neon laser via a fiberoptic for 25 min per session for 3 to 5 days (2-4 mW). Treatment was commenced on the day of onset of the infarction, with the patients presenting with 8 to 23,700 extrasystoles per 24 h. The incidence of extrasystoles was either abolished or markedly reduced (by 75 percent in some severe cases) by the laser therapy, while the control patients with frequent extrasystoles and high-grade arrhythmias failed to show any improvement. These

findings confirmed the efficacy of this approach in managing patients with acute myocardial infarction, a method that was devoid of any apparent complications. Figures 1; reference 6: 2 Russian, 4 Western.

UDC 615.849.19.015.4:617.713-018.7].07

Effects of Various Modalities of Laser Therapy on Corneal Endothelium

18400091b Moscow VESTNIK OFTALMOLOGII in Russian Vol 104 No 4, Jul-Aug 88 (manuscript received 14 Sep 87) pp 50-55

[Article by V. S. Akopyan, doctor of medical sciences, A. A. Kasparov, prof., Ye. L. Kazakova, candidate of medical sciences, N. V. Yermakov, L. I. Kochanovskaya, O. I. Ulanov and L. P. Naumidi, candidate of physiocomathematical sciences, All-Union Scientific Research Institute of Eye Diseases, USSR Ministry of Health, Moscow]

[Abstract] An analysis was conducted on corneal endothelial sequelae of iridectomies, trabeculoplasties, and trabeculo- and goniopunctures performed for various forms of glaucoma and capsulotomies carried out for secondary cataracts by three laser modalities. The studies were conducted on 60 eyes of 57 male and female patients with a mean age of 65.2 years. The microscopic assessment was conducted before the therapy and for up to 3 months thereafter to monitor the effects seen with various intensities and applications of pulsed Nd:YAG, constant argon, and pulsed ruby lasers. The data demonstrated that each form of laser induced changes in the corneal epithelium, the degree and extent of which was dependent on the intensity of the laser. The pathologic manifestations included edema, V-shaped microfissures, in Descemet's membrane, and cell loss. The rate of recovery was inversely related to the extent of injury, with cell loss varying from 7-9 percent with Nd:YAG laser to 121-14 percent with the ruby laser. It appears that optimum therapeutic effects are secured with laser intensities slightly above the threshold intensity for disruption of the endothelial cells, a procedure that entails far less cell loss than seen with microsurgery. References 10 (Western).

UDC 616.211-006.5-089.87:615.849.19

Laser Therapy in Polypous Rhinosinusitis

18400091c Ashkhabad ZDRAVOOKHRANENIYE TURKMENISTANA in Russian No 6, Jun 88 pp 13-14

[Article by M. A. Atamuradov, M. S. Pluzhnikov, B. S. Ivanov, S. V. Ryazantsev and S. Zh. Dzhandayev, Chair of Otolaryngological Diseases, Turkmen Order of Peoples Friendship State Medical Institute; Chair of Otorhinolaryngology, First Leningrad Medical Institute]

[Abstract] Comparative trials were conducted with several therapeutic modalities in the treatment of polypous rhinosinusitis, to assess the more conventional treatment procedures vis-a vis Nd:YAG laser therapy. The study involved 30 patients (Group I) managed by conventional

surgery, 18 patients (Group II) treated with cryosurgery, and 50 patients (Group III) in which conventional surgery was followed by Nd:YAG laser therapy ($0.5-1.0 \times 10^4$ W/cm² for 1-2 sec) of residual stem pathology. The rate of polyp recurrence in a 2-year follow-up period for the various groups was as follows: 27 patients in Group I, 4 patients in Group II, and 7 patients in Group III. The excellent results obtained with Group III were attributed to more complete eradication of residual polypous tissue with the Nd:YAG laser, with the possibility that local immunity and other factors were enhanced also given due consideration.

UDC 616.833.15-009.7+616.154-002]-085.849.19

Treatment of Trigeminal Neuralgia, Ganglioneuritis of Pterygopalatine Node, and Other Forms of Prosopalgias by Helium-Neon Lasers

18400091d Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII IMENI S. S. KORSAKOVA in Russian Vol 88 No 7, Jul 88 (manuscript received 17 Dec 87) pp 96-98

[Article by M. A. Shuster, V. M. Isayev, V. I. Rechitskiy and B. V. Agafonov, Department of Otolaryngology, MONIKI imeni M. D. Vladimirskiy]

[Abstract] Clinical trials were conducted with a number of Nd:YAG lasers to assess their effectiveness in managing trigeminal neuralgia, ganglioneuritis of the pterygopalatine node, and other forms of prosopalgias. The cohort consisted of 75 patients ranging in age from 25 to 84 years with a 2 month to 31 year history of the afflictions in question. The patients were treated by the contact method using 20-40 mW/cm² outputs for 1 to 10 min. The general course of treatment was for 10 to 12 days, with a few severe cases treated for 15 days, for one or two courses. When needed, a second course of treatment was employed 1 to 2 months after the first. Stable remission of 2 years duration was obtained in 44 of the patients. In 11 patients that showed abatement of pain after the first course of treatment recurrence was reported within 1 to 9 months, and was successfully treated in 9 cases by another course of Nd:YAG laser irradiation. On balance, treatment with Nd:YAG lasers was found to be effective in the management of these conditions, a modality that had the added advantages of simplicity and good tolerance by the patients. Figures 1; references 15: 12 Russian, 3 Western.

UDC 615.849.19:616.127-008:616.72-002.77-07

Laser Effects on Heart Function in Patients with Rheumatoid Arthritis

18400091e Baku AZERBAJDZHANSKIY MEDITSINSKIY ZHURNAL in Russian No 6, Jun 88 pp 17-20

[Article by G. M. Kanbarov, S. A. Tagiyeva, V. A. Azizov and V. V. Tsurko, Azerbaijan Order of the Red Banner of Labor State Medical Institute imeni N. Nari-manov]

[Abstract] Therapeutic trials were conducted on patients with rheumatoid arthritis to determine the safety laser

therapy vis-a-vis cardiac function. The 20 patients (25 to 59 years old) had a 4-5 years history of stage II rheumatoid arthritis and were treated by irradiation of the affected joints with a helium-neon laser (1-5 min per joint, 1.0-1.5 mW/cm², 5-6 times per week for 25-30 days). The patients were monitored by a variety of criteria intended to reflect myocardial functional status, and followed for clinical status of the rheumatoid state. The resultant findings demonstrated that the helium-neon laser therapy was without adverse effects on the cardiovascular system and, in fact, led to improvement in myocardial contractility in 60 percent of the patients. In addition, the clinical symptomatology of the underlying rheumatoid arthritis was alleviated, with mitigation of morning stiffness, improved hand strength, etc. The latter indicated abatement of the inflammatory process without adverse sequelae on cardiac function. References 5: 1 Bulgarian, 4 Russian.

UDC 615.849.19:612.017.2:615.47

Effect on Laser Therapy on Physiological Adaptability

18400091f Tbilisi SOOBASHCHENIYA AKADEMII
NAUK GRUZINSKOY SSR in Russian Vol 130 No 3,
Jun 88 (manuscript received 12 Nov 87) pp 649-652

[Article by K. I. Pagava, I. F. Mineyev, A. V. Pagava and
T. O. Alashvili, Tbilisi State Medical Institute]

[Abstract] Trials were conducted with the effects of helium-neon laser irradiation of reflexogenic points in 72 10-14-year old children with a variety of somatic disorders (bronchial asthma, pneumonia, cholecystopathies, autonomic vascular dystonia) on physiological adaptability. The bioactive points were subjected to irradiation with 10-20 mW/cm² laser beams for 10-15 sec per point, with coverage of 5-7 points per session. Monitoring of the patients showed that the laser therapy normalized myocardial contractility in 5 of 9 affected children, sinus arrhythmia was corrected in 7 out of 16, and marked tachycardia was moderated in 8 out of 18 cases. Assessment of the neurologic status of the children showed, basically, normalization of parasympathetic-sympathetic balance leading to restitution of autonomic balance. The data confirmed the value of variation pulsometry, and autocorrelational and spectral analyses of the cardiac rhythmicity in assessing the potential for physiological adaptability and responsiveness to therapeutic measures in the pediatric population. Figures 1; references 4 (Russian).

Georgian VUZ Text Includes Chapter on AIDS
18130033 Tbilisi KOMUNISTI in Georgian 11 Nov 88
p 4

[Article by Professor A. Asatiani, corresponding member of the Georgian SSR Academy of Sciences and rector of Tbilisi State Medical Institute, and Professor L. Sakvarelidze, corresponding member of the USSR Academy of Sciences, under the rubric "Bookshelf": "Infectious Diseases"]

[Text] Professor Eter Botsvadze, a Distinguished Medical Scientist and head of the Infectious Diseases Department of Tbilisi State Medical Institute, has just published a textbook called "Infectious Diseases." The book is intended for physicians and medical institute students.

Exhaustive information about infectious diseases is hard to find in textbooks available until now, especially in the Georgian language. E. Botsvadze's textbook has been developed in accordance with the new VUZ program and consists of a general part and a particular part. The general part presents an exhaustive interpretation, at today's level, of the infection process, the complex relations among the microbes and microorganisms that are the factors which cause infection, and the principles of the diagnosis and treatment of infectious diseases. The author makes skillful use of the latest information in the world literature as well as her own rich clinical experience and the findings of her extensive scientific research. In order to interpret the infection process correctly, she has made use of the latest scientific advances in epidemiology, virology, immunology, allergology, and other related fields. This greatly enhances the value of the book.

The particular part of the textbook covers all the infectious diseases of adults; some of the diseases appear in this textbook for the first time. It is written on a high scientific level and presents a concise and exhaustive examination of each disease's mechanisms of development, paths and factors of transmission, and the latest advances in prevention. Of special value is the chapter on hepatitis and meningococcus; the author presents a new and original classification of the clinical forms of these diseases and the latest methods of diagnosis and treatment, the practical adoption of which in our republic has reduced the lethality of these grave diseases to a minimum.

Of exceptional value is the chapter which deals with AIDS, the 20th century's "black plague"; in it the author gives us the latest information concerning the disease's causative and transmission mechanisms, clinical practice, diagnosis, treatment, and prevention. It is the first time that AIDS clinical practice has been presented in this form on the basis of analysis of available data in the literature.

The author pays tribute to Georgian scientists who have played a major role in studying and combatting infectious and parasitic diseases in Georgia. The work has an

appendix containing the normal values, in the international system, of basic laboratory indicators; this greatly enhances the worth of the textbook.

The author presents the results of scientific clinical research. It is written in excellent Georgian and is abundantly illustrated with classical and, of special value, the author's own clinical examples. The book is very well printed, to the credit of Ganatleba Publishing House and the staff of the Georgian SSR Academy of Sciences Printing Plant. The work was edited by Docent T. Katsitadze; reviewers are Professors V. Bochorishvili and O. Zenaishvili. Staffers of the author's department contributed a great deal to the work's preparation.

The work is of real value to students and practicing physicians as well as to young researchers in the field.

UDC 615.387+615.385.1].014.41

Effects of Room Temperature on Preserved Blood and Packed Red Cells

*18400035a Moscow GEMATOLOGIYA I
TRANSFUZIOLOGIYA in Russian Vol 33 No 5,
May 88 (manuscript received 9 Mar 87) pp 21-25*

[Article by N. N. Tibilova, V. A. Agranenko, professor, N. A. Markova, O. V. Platonova, O. N. Yermolchuk, and V. L. Golubeva, Central Scientific Research Institute of Hematology and Blood Transfusion, USSR Ministry of Health, Moscow]

[Abstract] In view of the fact that it is not always feasible to maintain preserved blood and packed cells at refrigerator temperatures, a study was conducted on the effects of room temperature and the duration tolerable storage at that temperature. Analysis of pH, degree of hemolysis, and levels of ATP, 2,3-DPG, glucose, and lactate for blood and packed erythrocytes stored at 4°C and 22°C showed that, at room temperature, blood and packed cells may be maintained for a maximum of 3 days in Glugitsir [sic]. The changes evident at 22°C after 2 days were essentially equivalent to those seen in blood and packed cells stored at 4°C for 21 days. In addition, studies were also conducted that demonstrated that blood and packed cells could be stored for 8-10 h at 22°C and then at 4°C for 21 days without any appreciable differences from results obtained with continuous storage at 4°C. Furthermore, the packed RBCs retained stability when preserved with Eritronaf [sic] for 7 days at 22°C, as well as in Eritropifaden [sic] for 3 days at 22°C. References 14: 5 Russian, 9 Western.

UDC 615.384:547.221].033/.034.076.9

**Enhancement of Circulatory Half-life of
Perfluorodecalin in Rats**

18400035b Moscow *GEMATOLOGIYA I
TRANSFUZIOLOGIYA in Russian Vol 33 No 5,
May 88 (manuscript received 1 Oct 86) pp 25-28*

[Article by T. K. Putyatina, Yu. D. Aprosina, and N. I. Afonin, doctor of medical sciences, Central Scientific Research Institute of Hematology and Blood Transfusion, USSR Ministry of Health, Moscow]

[Abstract] Half-life determinations were conducted on intravenously administered perfluorodecalin (PFD) emulsions in outbred albino rats to assess the feasibility of enhancing the duration of PFD circulation via additional administration of egg yolk phospholipids (EYP). Studies with 25 percent by vol. PFD emulsified with EYP, proxanol P-268, or 85 percent proxanol + 15 percent EYP mixture, showed that with the administration of 25 ml/kg of the PFD emulsion and intraperitoneal administration of EYP in the form of a 20 percent emulsion in water for 2-3 days prolonged the half-life of PFD. The control half-life for PFD of 26 h was extended to 52 h with the gradual infusion of the EYP dispersion at a daily rate of 5.4 g/kg. The minimum EYP dose for a statistically significant extension of the PFD circulation in the bloodstream was 2.7 g/kg. With both EYP dosages the levels of PFD remained relatively constant for 22 h, decreasing after ca. 30 h. Analogous studies with a Finnish fatty emulsion, 20 percent lipofundin, failed to prolong the circulatory half-life of PFD. Furthermore, additional administration of EYP failed to affect half-life values of the PFD-proxanol emulsions. The data were interpreted to signify that EYP does not cause a systemic blockage of the RES, but selectively inhibits the phagocytic activity of macrophages with respect to emulsion particles coated with a phospholipid layer. The enhanced clearance seen after 30 h may be due to loss of the phospholipid coat from the emulsion particles. Figures 5; references 5: 1 Russian, 4 Western.

UDC 617-001-003.9-092.9-07:616.153.1:577.152.313

**Cytophotometric Determination of Alkaline
Phosphatase in Neutrophils and Fibroblasts
During Wound Healing**

18400063h Moscow *BYULLETEN
EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 105 No 4, Apr 88 (manuscript received
3 Jun 87) pp 486-488*

[Article by M. A. Lushchitskiy, K. K. Zaytseva, V. A. Bubnov, A. P. Utochkin and V. V. Grigoryev, Chair of Naval and Hospital Surgery, Scientific Research Laboratory of Electron Microscopy and Histochemistry, Military Medical Academy imeni S. M. Kirov, Leningrad]

[Abstract] A cytophotometric study was conducted on the patterns of alkaline phosphatase (AP) activity of neutrophils in relation to wound healing in outbred, 180-200 g, male mice. The determinations of AP activity were conducted on blood neutrophils and cryostat sections of the healing wound, consisting of a 3 cm² area of skin from which a full-thickness plug had been removed. The cytophotometric determinations demonstrated that blood neutrophils fell into three categories, showing low, intermediate, and high levels of AP activity. Onset of the lesion was accompanied by elevation in the fraction of cells showing high levels of AP, confirming other publications on the relationship between an inflammatory process and AP activity of neutrophils. Monitoring the parameters of interest demonstrated that as the wound healed and decreased in size the levels of neutrophils and their AP activity at the wound site diminished in a proportional manner. Peak blood levels of neutrophils with high AP activity were seen 7 days after the wound had been inflicted, and diminished thereafter as the inflammatory process was replaced by one of active proliferation of the repair elements in the wound. This temporal change was also accompanied by an increase in the fibroblast counts in the wound and intensification of fibroblast AP activity. By day 21, when healing had been essentially completed, tissue neutrophil counts and their AP activity were at background levels, although the circulating neutrophil fraction with high AP levels showed residual elevation. These findings indicate that cytophotometric monitoring of neutrophil AP activity constitutes a valid parameter on which to base evaluation of an ongoing inflammatory process. Figures 1; references 7: 4 Russian, 3 Western.

UDC 579.69:620.193.8

Involvement of Denitrifying Bacteria in Steel Corrosion

18400082a Moscow MIKROBIOLOGIYA in Russian Vol 57 No 3, May-Jun 88 (manuscript received 20 Oct 86) pp 481-484

[Article by S. A. Abdrashitova, D. R. Kairgeldina and A. N. Ilyaletdinov, Institute of Microbiology and Virology, Kazakh SSR Academy of Sciences, Alma Ata]

[Abstract] Two species of denitrifying bacteria, *Pseudomonas mendocina* 28 and *Ps. stutzeri* 18, were tested for their corrosive properties on steel St3 in relation to their metabolic characteristics. The trials were conducted under various condition with 20 x 20 x 1 mm St3 plates, with the degree of corrosion evaluated by gravimetric methods. The resultant findings demonstrated that in the presence of nitrates, the genus reducing nitrate to nitrite (*Ps. mendocina*) was far more corrosive than the genus (*Ps. stutzeri*) that reduced nitrates to gaseous products. After 45 days of incubation in a nitrate medium the loss with *Ps. mendocina* was on the order of 400 g/m², and with *Ps. stutzeri* approximately 300 mg/m². The greater degree of corrosion due to *Ps. mendocina* was attributed to the presence of nitrate radicals and other metabolites that react with iron, accounting for the fact that the level of corrosion was comparable to that obtained with *Desulfovibrio desulfuricans*. Figures 3; reference 7: 6 Russian, 1 Western.

UDC 582/28:620.198.82

Synthesis of Metabolites with *Aspergillus Niger* V. Tiegh on Polymeric Substrates after Various Conditions of Storage

18400082b Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian Vol 22 No 3, May-Jun 88 (manuscript received 9 Mar 87) pp 240-243

[Article by M. g. Simonyan, I. A. Reshetnikova and M. V. Gorlenko, Institute of Microbiology, Armenian SSR Academy of Sciences, Yerevan; Moscow State University]

[Abstract] An evaluation was conducted of the effects of the conditions of preservation of *Aspergillus niger* on its synthetic potential on various polymeric substrates. *A. Niger* F-33 was maintained for 1 to 24 years under a variety of conditions, including lyophilization, periodic reculturing on Czapek's medium, under vaseline, in the soil, in liquid nitrogen, and on polymeric materials (polyamides, polyester, polyfluoroethylene). After various storage modalities the genus did not lose its ability to grow on media with polyamide, polyester, or polyfluoroethylene as the sole source of carbon. *A. niger* F-33 retained its ability to produce citric acid on all three polymers, with the highest levels of production displayed by *A. niger* that had been lyophilized for 1.5 to 15 years. Highest catalase activity was displayed by strains maintained under liquid nitrogen, and highest o-diphenoloxidase activity was shown by strains maintained on polyamide and in soil. Retention of high lipase activity was favored by storage in the soil and at the temperature of liquid nitrogen. These cursory studies demonstrated that the synthetic capabilities of *A. niger* may be modified by the methods used for preservation, and that such factors should be taken into consideration when assessing the biodegrading potential of *A. niger*. Tables 3; references 8 (Russian).

UDC 577.213.7:577.152.34

Cloning, Expression and Structure of Functionally Active, Shortened *lon* Gene of *Escherichia Coli*
18400032e Moscow BIOORGANICHESKAYA
KHIMIYA in Russian Vol 14 No 3, Mar 88 (manuscript received 23 Jun 87; after revision 2 Nov 87) pp 408-411

[Article by A. Yu. Amerik, L. G. Chistyakova, N. I. Ostroumova, A. I. Gurevich and V. K. Antonov, Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow]

[Abstract] ATP-dependent La proteinase, coded by the *lon* gene, plays a dominant role in the rapid degradation of proteins with altered or incomplete structure in *E. coli* cells. This enzyme belongs to the heat shock group of proteins and participates in such processes as cell sensitivity to UV radiation, cell division and formation of capsular polysaccharides. La proteinase is of interest to enzymologists and gene engineers in the development of methods to prevent rapid degradation of expressible proteins and peptides. In this work, the plasmid vector pBR327 was used to clone the *lon* gene. The full nucleotide sequence of the gene is presented. The gene cloned here did not have the terminating codon and was thus somewhat abbreviated. The protein synthesized upon its expression had an altered C-terminal amino acid sequence by comparison with La proteinase. The shortened *lon* gene appeared to differ little from the complete gene, because the protein molecular mass computed on the basis of its structure is close to that of the La proteinase. The changes in the *lon* gene do not influence its phenotypic manifestations or the capacity of the synthesized protein for ATP-dependent proteolysis. Studies are continuing on production of the full-sized *lon* gene. Figures 2, references 11: Western.

UDC 577.113.5.088;519.85

Use of Personal Computer ISKRA-226 PC to Reconstruct Long Polynucleotide Sequences from Fragments
18400061a Moscow BIOORGANICHESKAYA
KHIMIYA in Russian Vol 14 No 4, Apr 88 (manuscript received 29 Apr 87; in final form 2 Oct 87) pp 515-521

[Article by P. V. Kostetskiy and I. Ye. Dobrova, Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow]

[Abstract] The functions of a CONTIG program for the reconstruction of DNA from polynucleotide fragments obtained by gel electrophoresis are described in a cursory manner. The program was written in BASIC designed for use with the Soviet ISKRA-226 personal computer. The basic approach rests on the integration of a number of fragments into a proper sequence, with the arrangement of the contiguous nucleotide fragments (contigs) related to a fundamental or prime fragment (represented by one of the longest fragments with reliable sequence data.) In

that manner, the proper placement of all the fragments with overlapping sequences are arranged, based on paired comparisons of the coordinates of the 5'-ends. The 5'-end of each sequential fragment in the contig is located to the right of the 5'-end of the preceding fragment. Bidirectional elongation of the contig proceeds in an analogous manner by selecting prime fragments with a 3'-end located farthest to the right. Studies with the alpha subunit gene of pig kidney Na,K-ATPase, 3420 nucleotides long and yielding 70 fragments with a mean length of 200 nucleotides, required ca. 1.5 h for full sequence reconstruction. The approach was found to be reliable when the error rate for nucleotide sequences was on the order of 7 percent or better. Figures 2; references 15: 3 Russian, 12 Western.

UDC 576.8.097.29:547.962.3

Intrinsic Fluorescence Studies on Effects of pH on Structure of Mistletoe Lectin
18400062a Moscow MOLEKULYARNAYA
BIOLOGIYA in Russian Vol 22 No 3, May-Jun 88 (manuscript received 27 Mar 87) pp 628-634

[Article by T. L. Bushuyeva, A. G. Tonevitskiy, A. Kindt* and H. Franz,* Institute of Experimental Cardiology, All-Union Cardiological Scientific Center, USSR Academy of Medical Sciences, Moscow; *Institute of Immune Preparations and Nutrient Media, Berlin, GDR]

[Abstract] Intrinsic fluorescence characteristics of the mistletoe lectin I (MLI), a molecule consisting of A (29 kD) and a B (34 kD) subunit, were used in assessing the structural characteristics of this molecule in relation to pH. The fluorescence spectra of MLI are determined by its 8 tryptophan residues, as are those of the constituent subunits. The position of the fluorescence maximum of MLI and of its two subunits are little affected by pH in the 4 to 8 range, suggesting the absence of any significant conformational changes in the tryptophan environment. A sharp decrease in the quantum yield of fluorescence at pH in the case of the A subunit was evidently due to quenching of a protonated carboxyl group. The B subunit showed a similar loss of fluorescence at pH 4-5, which was also accompanied by a ca. 3 nm hypsochromic shift from 330 nm. The latter change indicated alterations in the environment of the tryptophan residues and, therefore, conformational changes in the B subunit. A bathochromic shift in the case of the B subunit at pH was probably due to unwinding of the peptide chain. Evaluation of the effects of ionic strength (0 to 0.4 M KCl) on MLI and the two subunits demonstrated that the subunits were less stable than the native lectin. Further confirmation for this contention was obtained in studies on the effects of guanidine dihydrochloride and quenching agents (Cs⁺, I⁻, acrylamide). At acid pH values, MLI and the A subunit possessed greater stability than the B unit. Stability of MLI and the B subunit was enhanced by binding lactose. The pH-dependent conformational

changes observed here may be a factor in transmembrane transport of MLI and of its component structures. Figures 4; reference 15: 2 Russian, 13 Western.

UDC 577.218:577.122.2+577.123.2

Stabilization of Foreign Gene Products in E. Coli with Mutations in Genes pnp And htpR

18400062b Moscow MOLEKULYARNAYA
BIOLOGIYA in Russian Vol 22 No 3, May-Jun 88
(manuscript received 4 Aug 87) pp 760-766

[Article by Ye. V. Klyachko, Ye. S. Lysenko, M. R. Yeremashvili, Yu. I. Kozlov, A. Ya. Strongin and R. S. Shakulov, All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow]

[Abstract] In order to evaluate mechanisms that may be used in enhancing the expression of foreign genes in genetically-engineered bacterial cells, as well as in increasing product yield, studies were conducted on the persistence of foreign mRNA and interferon production in engineered E. coli with mutations in genes pnp and htpR. The study showed that in E. coli bearing mutated pnp gene (coding for polynucleotide phosphorylase, EC 2.7.7.8) degradation of mRNA molecules produced by a foreign bacterial gene—*Bacillus amyloliquefaciens* alpha-amylase—was not affected. However, the half-life of human leukocytic alpha-2 interferon mRNA was increased from 25 to 90 sec. Studies with E. coli bearing a mutation in the htpR gene showed that its partial inactivation led to a 10-fold increase in the accumulation of interferon in comparison with the parental E. coli strain. This observation demonstrated that heat shock proteins, under the control of htpR, are involved in interferon degradation in E. coli and that, presumably, this is due to proteinase La. The resultant data demonstrated that the use of appropriate E. coli strains may be used to enhance the efficiency of genetic engineering. Mutations in the pnp gene may be manipulated to enhance the half life of eukaryotic mRNA (in itself ensuring a 2-fold increase in interferon production),

while htpR mutants may show diminished degradation of the foreign product and thus produce higher yields. Figures 3; references 33: 3 Russian, 30 Western.

UDC 578.282

Effects of 3'-Azido-3'-Deoxynucleosides on Reproduction of Aids Virus in Tissue Culture

18400062c Moscow MOLEKULYARNAYA
BIOLOGIYA in Russian Vol 22 No 3, May-Jun 88
(manuscript received 20 Aug 87) pp 802-806

[Article by G. A. Galegov, M. N. Korneyeva, D. N. Nosik, T. Yu. Kileso, A. A. Krayevskiy*, M. K. Kukhanova* and V. M. Zhdanov* (deceased), *Institute of Molecular Biology, USSR Academy of Sciences, Moscow; Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow]

[Abstract] Studies were conducted to assess three nucleoside derivatives for their efficiency in limiting the reproduction of the AIDS virus in two human cell cultures (lymphocytes, and lymphoblastoid line H9/IIIB provided by R. Gallo, NIH, USA). The congeners undergoing testing were 3'-azido-3'-deoxythymidine (Az-T), 3'-azido-3'-deoxyarabinothymidine (Az-AT), and 3'-azido-2',3'-dideoxy-5-methylcytidine (Az-dCMe). Although all three agents inhibited the reproduction of the AIDS virus in the cell cultures, the efficiency of Az-A was clearly most impressive and attained in concentrations (10-20 μ M) allowing ca. 80 percent cell survival over a 5 day period. The low efficiency of Az-AT and of Az-DCMe was apparently due to their low level of transformation into 5'-triphosphate. The efficiency of Az-T was attributed to its efficient metabolic transformation into the 5'-triphosphate (Az-TTP), which inhibits DNA synthesis by the AIDS virus reverse transcriptase. Additional experiments demonstrated that ribavirin did not prevent cell death following infection with the AIDS virus when used in concentrations of 110 and 220 μ M. Consequently, diminished production of the AIDS antigen may have been due to the cyto-toxic effects of ribavirin, which became apparent at concentrations of 55 μ M. [Note: Soviet acronym for AIDS is SPID, i.e., syndrome of acquired immune deficiency] Figures 1; references 23: 8 Russian, 15 Western.

UDC 591.1:611.8

Importance of Glial Components in Neural Response to Constant Magnetic Field

18400069a Moscow IZVESTIYA AKADEMII NAUK
SSSR: SERIYA BIOLOGICHESKAYA in Russian
No 3, May-Jun 88 (manuscript received 20 Mar 86)
pp 384-391

[Article by N. I. Bravarenko, P. M. Balaban, V. N. Mats and A. R. Kuznetsov, Institutes of Chemical Physics and of Higher Nervous Activity and Neurophysiology, USSR Academy of Sciences, Moscow]

[Abstract] The common snail (*Helix lucorum*) was employed in a study designed to assess the role of perineuronal glia in neuronal responsiveness to a constant magnetic field. The data were evaluated in terms of the effects of glial loss on the input resistance (R_i) of CNS neurons exposed to a constant magnetic field (1200 Oe; ca. 20 Oe/cm). Previously published reports had shown that in CNS preparations R_i represented a most sensitive indicator of magnetic field exposure, with R_i increasing in spontaneously active cells and decreasing in electrically silent neurons. Treatment of the CNS preparation with 1 percent pronase for 60 min led to statistically significant elevation of the resting potential by 3-5 mV, but abolished changes in the R_i values of both the active and silent neurons. Concomitant histologic observations demonstrated the loss of the glial elements as a result of pronase treatment. Treatment of the CNS preparations with 0.5 percent papain for 3-5 min did not affect the glial elements and had no bearing on the R_i parameters on exposure to the magnetic field. These findings underline the importance of the perineuronal glia in the responsiveness of neural elements to constant magnetic fields. In view of the electrical inactivity of the glia, it appears that metabolic alternations in the glial elements induced by the magnetic field eventually affect neuronal function. Figures 4; references 11 (Russian).

Long-Term Status of T- and B-Cell Components of Immune System After Localized Microwave Irradiation

18400092a Frunze ZDRAVOOKHRANENIYE
KIRGIZII in Russian No 4, Jul-Aug 88 pp 36-39

[Article by V. M. Yevstropov, I. N. Silich, R. A. Zulkarneyev, O. P. Modnikov and N. G. Lomtev, Kirghiz Scientific Research Institutes of Health Resort Science and Physical Therapy and of Oncology and Radiology]

[Abstract] An evaluation was conducted on the effects of microwave irradiation of the thymic area and of bone marrow (shank) on the T- and B-cell components of the

immune system in the guinea pig. The guinea pigs were subjected to irradiation from a Romashka source with a flux density of 80 mW/cm² for 10 min per procedure between 0900 and 1100 h for 5 days. Irradiation of the thymus led to a decrease in both the absolute and relative counts of T cells, as well as diminished T-cell activity. Irradiation of the shank resulted in an initial (within 1 week) increase in circulating B-cells, followed by depression of B-cells counts and elevation of O lymphocytes. In the latter category, tests dependent on B-cells showed enhanced B-cell activity. These observations demonstrated that microwave irradiation may be used to modulate the immune system in a selective manner. Irradiation of the thymus depresses T-cell dependent immune functions without affecting B-cell based immunity, while irradiation of the bone marrow depressed B-cell immune functions but had no impact on the T-cells. An added advantage of this approach to modulation of the immune system rests on the avoidance of chemical agents.

UDC 613.647-07:[612.015.3+612.821.1]/.3

Behavioral and Biochemical Correlates of Month-Long Microwave Irradiation of Albino Rats

18400092b Moscow GIGIYENA I SANITARIYA
in Russian No 5, May 88 (manuscript received
2 Jun 87) pp 33-35

[Article by M. I. Rudnev, M. A. Navakatikyan and V. P. Artyukh, Kiev Scientific Research Institute of General and Communal Hygiene imeni A. N. Marzeyev]

[Abstract] Confirmatory studies were conducted on the effects of microwave irradiation on the behavioral and biochemical characteristics of albino rats as part of a cooperative research effort with the US entitled "Assessment of Biological Effects of Physical Environmental Factors." The animals, Fisher-344 male rats, were exposed to 2450 MHz microwave irradiation (0.27 W/kg, 1 mW/cm²) for 7 h/day for 1 month at 21 degrees C with a relative humidity of 50 percent. During the month of irradiation and for 15 days thereafter the animals were kept in individual 17 x 24 x 13 cm polyethylene cells. Extensive behavioral and biochemical monitoring of the rats led to the observation that the sole change that was observed was in the weight of the left adrenal gland. In the experimental animals the weight of that gland was 28.41 +/- 1.59 mg 15 days after irradiation was discontinued, and in the control unirradiated animals, 25.76 +/- 1.15 mg. This difference was attributed to neurogenic stress engendered by the isolation. References 12: 9 Russian, 3 Western.

UDC 615.217.34:546.39-38

Anticholinesterase Activity of Monoquaternary Ammonium Salts with Hydrophobic Radicals

18400080c Moscow

KHIMIKO-FARMATSEVTICHESKIY ZHURNAL
in Russian Vol 22 No 6, Jun 88 (manuscript received
3 Feb 87) pp 686-691

[Article by I. I. Bityukova, N. D. Igumnova, N. V. Klimova, V. M. Solovyev, A. P. Skoldinov and D. A. Kharkevich, First Moscow Medical Institute imeni I. M. Sechenov; Institute of Pharmacology, USSR Academy of Medical Sciences, Moscow]

[Abstract] The anticholinesterase activities of a series of monoquaternary ammonium salts with hydrophobic groups were studied in view of certain similarities between acetylcholine receptors and the enzyme. In compounds under study one of the methyl groups was replaced by a ring radical differing in hydrophobicity and represented by cyclohexyl, phenyl, or 1- or 2-adamantyl. Data on the type of inhibition obtained with human erythrocyte acetylcholinesterase are summarized in tabular form, as are the inhibition constants. The adamantyl congeners exhibited greater inhibitory activity than did the phenyl and the cyclohexyl derivatives, and did not serve as substrates. References 13: 9 Russian, 4 Western.

UDC 615.214:547.898].07

Psychotropic Properties of Aza-15-Crown-5 Derivatives with Pharmacophoric Groups

18400080b Moscow

KHIMIKO-FARMATSEVTICHESKIY ZHURNAL
in Russian Vol 22 No 6, Jun 88 (manuscript received
18 Feb 87) pp 679-682

[Article by T. A. Voronina, T. L. Karaseva, N. Ya. Golovenko, M. G. Rokachinskaya, S. S. Basok, S. E. Shaparova, Ye. Yu. Kulygina and N. G. Lukyanenko, Physiochemical Institute imeni A. V. Bogatskiy, Ukrainian SSR Academy of Sciences, Odessa]

[Abstract] The search for less toxic aza-crown ethers led to the synthesis of aza-15-crown-5 (I) N-(beta-alanyl) aza-15-crown-5 (II) N-(gamma-aminobutyrylglycyl)-aza-crown-5 (III), and N-(epsilon-aminohexanoyl)-aza-15-crown-5 (IV) for psychotropic evaluations. Studies on outbred male mice (18-20 g) showed that III and IV possessed antianamnestic action, while compounds I and II were ineffective when administered intraperitoneally in doses of 50 mg/kg. Evaluation of antihypoxic effectiveness in mice treated intraperitoneally with 300 mg/kg NaNO₃ showed that compounds II and III enhance the survival, 2.2- and 2-fold, respectively. Compound IV increased the survival rate 1.6-fold, while compound I was ineffective. Similarly, in acticonvulsive studies, the control compound (I) was without beneficial effect, while compounds II, III, and IV were clinically

beneficial. These observations demonstrated that II, III, and IV possesses psychotropic activity, exert an antihypoxic effect, diminish murine motor activity in open-field trials, and are relatively nontoxic. As such, they are perspective agents for further development as potential agents with clinical applications. Figures 1; references 7: 5 Russian, 2 Western.

UDC 615.849.1.015.25:547.745].012.1

Synthesis and Radioprotective Properties of 2-Pyrrolidone Derivatives

18400080d Moscow

KHIMIKO-FARMATSEVTICHESKIY ZHURNAL
in Russian Vol 22 No 6, Jun 88 (manuscript received
23 Feb 87) pp 705-710

[Article by N. I. Lisina, G. A. Chernov, Yu. M. Bizunov, V. I. Yemelyanov and I. L. Knunyants, Institute of Biophysics, USSR Ministry of Health, Moscow]

[Abstract] In view of the fact that certain derivatives of pyrrolidone show high radioprotective activity on experimental animals, toxicity and radioprotective trials were conducted with seven derivatives of 2-pyrrolidone. Cursory technical details are presented on the synthesis of the derivatives, that were then tested for toxicity on outbred mice and on (CBA x C57B1)F₁ for radioprotective efficacy. The LD₅₀ values for these compounds ranged from 340 to 1500 mg/kg per os and intraperitoneally. In addition, only one agent—N-[S-gamma-(isothiuroniumpropyl)-2-pyrrolidone chlorohydrate—showed moderate radioprotective activity (23.3 to 40.0 percent). These findings indicated that 2-pyrrolidone congeners do not appear to be promising as radioprotective agents. References 11: 7 Russian, 4 Western.

UDC 615.243:[547.95:547.943

Dalargin: Opioid-Like Peptide with Peripheral Action

18400094a Moscow FARMAKOLOGIYA I

TOKSIKOLOGIYA in Russian Vol 51 No 4, Jul-Aug 88
(manuscript received 19 May 87) pp 35-38

[Article by N. V. Korobov, All-Union Cardiological Research Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] Experimental trials were conducted to assess the scope of peripheral action of dalargin (Tyr-DALA-Gly-Phe-Leu-Arg), an opioid-like hexapeptide, and its pentapeptide (lacking terminal Arg) and tetrapeptide (lacking terminal Leu-Arg dipeptide) analogs. The peptides were evaluated in terms of inhibition of electrically-stimulated contraction of isolated guinea pig ileum and mouse large intestine and vas deferens. The study demonstrated that two dalargin fragments—DALA-Gly-Phe-Leu and Tyr-DALA-Gly were inactive—while dalargin and its penta- and tetrapeptide analogs evidenced generally similar patterns of activity on the test systems in

question. Dalargin and, especially, the pentapeptide showed considerable activity in the mouse large intestine test where responsiveness is dependent on noncholinergic and nonadrenergic mechanisms involving as yet unidentified opioid receptors. On the whole, dalargin and its penta- and tetrapeptides appear to act preferentially on the unidentified types of receptors, as well as the delta receptors. Their interaction with mu-type receptors seems to be weak, as distinct from the strong reactivity of FK-33-824, a stable enkephalin analog. Trials with BALB/c male mice demonstrated that the analgetic effects of dalargin and its analogs on intracisternal administration was one to three orders of magnitude lower than the analgetic potency of FK-33-824, a difference increasing to 40-fold on intravenous administration. It appears, therefore, that dalargin and its analogs act primarily on peripheral opioid receptors. Figures 1; references 10: 4 Russian, 6 Western.

UDC 616.714+616.831]-001.085.357:577.175.829]-036.8

Differential Management of Head Injury Sequelae with Neuropeptides

18400094b Moscow *ZHURNAL NEVROPATOLOGII I PSIKHIATRII IMENI S.S. KORSAKOVA in Russian*
Vol 88 No 5, May 88 (manuscript received 2 Dec 86)
pp 41-42

[Article by S. M. Tikhomirov and B. D. Bakharev, Department of Psychiatry, Leningrad Sanitary hygienic Medical Institute]

[Abstract] Therapeutic trials were conducted with Zn-corticotropin and Arg-vasopressin in selected cases of brain injury to assess these agents in management of

attendant sequelae. The experimental group for Zn-cortico-tropin consisted of 35 males, 26-35 years old, with closed head trauma consisting of contusion with subarachnoid hemorrhage. The patients presented with general weakness, emotional liability, chronic fatigue, loss of appetite, insomnia, etc. Management of the patients with 60-80 U/day corticotropin was continued for 5-6 days, a regimen repeated after a 5-6 day break. The data showed that addition of corticotropin to the conventional therapeutic regimen had both objective and subjective benefits in the mental and physical status of the patients. After 18-20 days, asthenic manifestation had almost completely disappeared, although improvements in the affective status were less pronounced. Another cohort of head injury patients presenting with onset of hypochondria consisted of 33 males ranging in age from 28 to 37 years. These patients were managed with 40-60 µg/day Arg-vasopressin for 5-6 days, with the course repeated after a week of nontreatment with vasopressin. The entire regimen consisted of 3 to 4 courses of vasopressin. Employment of vasopressin in this group led to improved sleep patterns, recovery of appetite, abatement of mental and physical difficulties, and reduction of excessive introspection. These findings indicated that the use of corticotropin and vasopressin is indicated on a selective basis in management of various manifestations of head trauma sequelae and appears to control their exacerbations. References 6 (Russian).

UDC 612.273:612.017.1:612.115+612.121

Effects of Acute Hypoxic Hypoxia on Immune System, Hemostasis, and Acid-Base Balance

18400030b Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 14 No 1, Jan-Feb 88 (manuscript received 18 Aug 86) pp 115-122

[Article by B. T. Tulebekov, T. A. Ponomareva, G. F. Vorobyev, L. R. Iseyev, and V. I. Chadov, Institute of High Altitude Physiology and Experimental Pathology, Kirghiz SSR Academy of Sciences, Frunze]

[Abstract] The effects of acute hypoxic hypoxia on blood coagulation, the immune system, and acid-base balance were studied on 10 male volunteers (33.4 year mean age) maintained at an altitude equivalent of 5100 m for 300 min in a BKK-270 pressure chamber. Even short-term (60 min) hypoxic hypoxia led to changes in the acid-base balance, with a fall in the plasma levels of HCO_3^- and significant elevation of pH to 7.44 at 180 min (pH 7.40 control value). Changes in the hemostatic system were apparent immediately and consisted of hypercoagulation, elevation of fibrinogen levels by 0.4 g/liter, moderate intravascular coagulation, and fibrinolysis. Effects on the immune system became apparent at a later date (7 days), and consisted of the virtual disappearance of null cells, elevated levels of T and B cells, and depression of T cell function. These observations confirmed the hypothesis that the immediate metabolic changes reflected in altered acid-base balance have further sequelae involving hemostasis and, eventually, the immune system. Figures 1; references 24: 12 Russian, 12 Western.

UDC 612.135.014.46:577.175.82

Effects of N-Terminal Fragment of P Substance on Microcirculatory System

18400063a Moscow BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian Vol 105 No 4, Apr 88 (manuscript received 13 Jul 87) pp 403-405

[Article by M. P. Gorizontova, Yu. Odaryuk, and M. Bienert, Laboratory of General Microcirculatory Pathology, Scientific Research Institute of General Pathology and Pathologic Physiology, USSR Academy of Medical Sciences, Moscow; Institute of Physiologically Active substances, GDR Academy of Sciences, Berlin]

[Abstract] A comparative study was conducted on the effects of substance P (SP) and its N-terminal 1-4 amino acid fragment (NTF) on the micro-circulatory system in 250-280 g male Wistar rats. The parameters under study consisted of the effects of SP or NTF on degranulation of mesenteric mast cells and permeability of mesenteric venules. The microscopic examinations showed that NTF was 0.007th as effective as SP in inducing mast cell degranulation, and as 0.0007th as effective in enhancing

venular permeability to fluorescein-labeled rabbit globulin. These observations suggest that NTF may be recommended for mitigating stress-induced organ and system damage, in view of its low pathogenicity for the microcirculatory system in comparison with SP. Figures 2; references 7: 2 Russian, 5 Western.

UDC 612.178.3.014.46:[547.95:547.943

Modulation of Excitation Transmission in Intracardiac Ganglionic Apparatus by Dermorphin

18400063b Moscow BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian Vol 105 No 4, Apr 88 (manuscript received 17 Feb 87) pp 438-439

[Article by N. A. Sokolova, V. I. Deygin and Ye. P. Yarova, Chair of Human and Animal Physiology, Biology Faculty, Moscow State University]

[Abstract] An analysis was conducted on the effects of dermorphin on neural transmission in the intracardiac ganglionic apparatus of *Rana temporaria* heart, using a right atrium-brain stem preparation. The electrophysiological studies demonstrated that addition of dermorphin exerted a dose-related inhibitory effect on impulse activity of the intracardiac nerve in the 10^{-6} to 10^{-12} M dermorphin range, with 50 percent reduction in the impulse rate elicited by 10^{-8} M dermorphin. Electroneurographic recordings failed to show impulse recovery over a 10 min observation period after maximum inhibition was attained. Similarly, washing the preparation with Ringer's solution failed to restore activity. The fact that the inhibition was mediated via opioid receptors was demonstrated in experiments in which 10^{-5} M naloxone blocked the effects of dermorphin. Dermorphin was without effect on transient activity of intracardiac postganglionic sympathetic fibers induced by the stimulation of sympathetic ganglia. Although it has not been determined as yet whether dermorphin acts at the pre- or postganglionic level, its role as a modulator of cardiac excitation in the frog has been demonstrated. Figures 1; references 9: 2 Russian, 7 Western.

UDC 612.112.94.071.4.014.46:615.31:[547.95:547.943

Effects of Dalargin on Natural Killer Activity of Human Lymphocytes

18400063c Moscow BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian Vol 104 No 4, Apr 88 (manuscript received 17 Jul 87) pp 442-445

[Article by Ye. N. Aleksandrova, Ye. L. Nasonov, V. A. Vinogradov and M. I. Titov, All-Union Cardiological Scientific Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] Trials were conducted on the effects of dalargin, a synthetic analog of leu-enkephalin, on the natural killer (NK) activity of human lymphocytes isolated from

blood. The lymphocytes were incubated with 10^{-14} to 10^{-6} M dalargin for 1 h at 37 degrees C, washed, and tested in single-cell experiments in agarose against human erythroleukemia cells K-562. Preincubation of the lymphocytes with dalargin increased the percentage of effector-target cell conjugates by 40.1 to 50.00 percent over control values. In the case of lymphocytes derived from a patient with systemic lupus erythematosus with depressed NK activity the increase was on the order of 30.5-41.6 percent with 10^{-10} to 10^{-8} M dalargin in the preincubation mixture. Killer activity, as indicated by the percentage increase in effector-killed target cell conjugates, was improved by 66.1 to 104.3 percent. Finally, the number of 'active' NK cells increased by 64.0 to 177.6 percent as a result of preincubation with dalargin. In the case of lymphocytes derived from some of the donors a bimodal pattern was evident on the dose-response plots, resulting in two peaks of activity corresponding to dalargin concentrations of 10^{-14} - 10^{-12} and 10^{-10} - 10^{-6} M. In addition, naloxone was found to act as an agonist of dalargin rather than as an antagonist. Comparison with human recombinant alpha-interferon showed that the former was more efficient in enhancing the cytolytic activity of the lymphocytes than the latter agent, suggesting dalargin may be useful in patients with depressed NK cell activity. Figures 1; references 15: 2 Russian, 13 Western.

UDC 616.37-002-092.9-085.31:[547.943]-036.8

Effects of Dalargin on Pancreatic Histology and Function in Normal State and in Experimental Pancreatitis

18400063d Moscow BYULLETEN
EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 105 No 4, Apr 88 (manuscript received
19 Jun 87) pp 445-447

[Article by A. N. Kurazanov, G. P. Titova, V. A. Vinogradov, V. A. Aleynik and N. F. Gerasimov, Central Scientific Research Laboratory, Andizhan Medical Institute; Department of Pathomorphology, Moscow Scientific Research Institute of Emergency Medicine imeni N. V. Sklifosovskiy]

[Abstract] The effects of dalargin on pancreatic function and histology were studied in dog and rat experiments to assess this synthetic analogue of leu-enkephalin as a potential therapeutic agent for pancreatitis. Administration of 50 µg/kg dalargin to dogs by various routes mitigated pancreatic secretion induced by various means both in terms of volume and in the reduction of protease, lipase, and amylase concentrations. The mechanism of action of dalargin in this case evidently involved inhibition of the release of secretin and cholecystokinin-pancreozymin. Histologic effects of dalargin were studied on 180-230 g male rats with experimental pancreatitis treated intraperitoneally with 50 µg/kg dalargin prior to the surgical procedure, and for the subsequent 8 h. the histologic data demonstrated that dalargin treatment markedly attenuated destructive histopathologic changes

in the pancreas and diminished the number and size of cysts. No cysts were evident in one dalargin-treated animal. The beneficial effects of dalargin appear to be exercised through its effects on pancreatic secretion as well as enhancement of microcirculatory status of the pancreas. Figures 1; references 10: 7 Russian, 3 Western.

UDC 616.37-002-092.9-085.31:[547.95:547.943]-036.8

Effects of Synthetic Analogs of L-Enkephalin on Viable Pancreatic Tissue in Experimental Pancreatitis

18400063e Moscow BYULLETEN
EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 105 No 4, Apr 88 (manuscript received
19 Jun 87) pp 447-451

[Article by A. S. Kanayan, N. K. Permyakov, G. P. Titova, N. A. Gabrielyan, L. O. Voskanyan and G. A. Gevorkyan, Central Scientific Research Laboratory, Yerevan Institute for the Advanced Training of Physicians; Pathomorphology Laboratory with Electron Microscopy Group, Moscow Scientific Research Institute of Emergency Medicine imeni N. V. Sklifosovskiy]

[Abstract] Histopathologic and functional studies were conducted on 180-200 g albino rats with experimental pancreatitis to assess the effects of intraperitoneal administration of two synthetic analogs of L-enkephalin—tageflar and dalargin. The animals were treated with 0.1 mg/kg of either agent immediately after induction of the pancreatitis by surface cooling with chloroethyl, at 2 and 24 h after the onset of pancreatitis, and monitored for 30 days. Comparison of the control, tageflar, and dalargin data demonstrated that in control rats recovery in the undamaged (duodenal) area of the pancreas consisted largely of intracellular regeneration. Use of tageflar and dalargin prevented the onset of interacinal and intracellular edema in the undamaged portion of the pancreas. Furthermore, while tageflar appeared to exert no specific effects on the morphometric features of the exocrine pancreas, it did interfere with the secretory process resulting in accumulation of pancreatic juice in the cytoplasm which may have been a factor in depression of protein synthesis. Dalargin, on the other hand, promoted moderate hypertrophy of the exocrine pancreatic tissue, retention of its secretory function, and evidently enhanced protein synthesis. The later type of changes were interpreted to reflect an active compensatory process in the viable areas of the pancreas. Reconstruction of acinar tissue, however, was delayed by treatment with the analogs and the tubular structures were lined with dystrophic epithelium that was eventually replaced by connective tissue. Figures 3; references 12: 7 Russian, 5 Western.

UDC 612.8-06:612.017.1

Model of Afferent Signals from Immune to Nervous System

18400063g Moscow BYULLETEN

EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 104 No 4, Apr 88 (manuscript received
14 Jul 87) pp 466-469

[Article by G. I. Chipens, Ye. A. Korneva, S. N. Sklyarov, V. M. Klimenko and R. E. Vegner, Department of Peptide Chemistry, Institute of Organic Synthesis, Latvian SSR Academy of Sciences, Riga; Department of Pathophysiology and General Pathology, Scientific Research Institute of Experimental Medicine, USSR Academy of Medical Sciences, Leningrad]

[Abstract] For a better understanding of neuroimmunology, search was conducted for a putative signal transmitter from the immune to the nervous system. One possible candidate for a transmitter function of this kind is the peptide Ser-Lys-Asp (SKD), found within the structure of many neural peptides and immunomodulators. The polar tripeptide SKD has been shown to inhibit antibody response against sheep erythrocytes, depress normal and elevated NK cell activity of cells derived from oncologic patients, and protect mice from viral infections. A single intravenous administration of 300 µg SKD to rabbits has been shown to evoke extensive electrical changes in cortical and deep structures of the brain that persisted for 24 h. These findings suggest that SKD may serve as a model system for investigating afferent effects of the immune system upon the nervous system. As such, SKD may represent a novel class of peptide mediators. Figures 3; references 15: 9 Russian, 6 Western.

UDC 612.884.014.46:615.31:577.175.82+616.8-009.7-092-02:615.31:577.17

Effects of Substance P and Its Fragments on Physiological and Pathological Nociception

18400077a Moscow BYULLETEN

EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 105 No 6, Jun 88 (manuscript received
9 Jul 87) pp 655-657

[Article by G. N. Kryzhanovskiy, S. I. Igonkina, V. V. Trubetskaya, P. Oehme and M. Bienert, Laboratory of General Neuropathology, Scientific Research Institute of General Pathology and Pathophysiology, USSR Academy of Medical Sciences, Moscow; Institute of Physiologically Active Substances, GDR Academy of Sciences, Berlin]

[Abstract] Studies were conducted on 200-250 g male Wistar rats to evaluate the effects of substance P (SP) and its SP₁₋₄ and SP₅₋₁₁ fragments on physiological and pathological nociception. The effects were evaluated in terms of a number of parameters following intraperitoneal (250 µg/kg SP; 107 µg/kg SP₁₋₄; 141 µg/kg SP₅₋₁₁) and direct administration via a cannula into the dorsal raphe

nucleus (3 µg) of the peptides under study. Physiological pain was induced by the application of heated (55 degrees C) plates, while pathological pain followed from the application of a penicillin-impregnated agar plate (1.5 x 3 x 6 mm) to the posterior horn of the lumbar spinal cord. Evaluation of the latent periods and other modalities showed that all three peptides exerted an analgesic effect. The efficacy as an analgesic factor on intracerebral injection ranked as follows: SP₅₋₁₁ is greater than SP is greater than SP₁₋₄. On intraperitoneal administration the ranking was SP₅₋₁₁ is greater than SP. These findings demonstrated that SP and its fragments act on the nociceptive centers in the brain to modulate pain perception. Figures 2; references 6: 1 Russian, 5 Western.

UDC 6;822.014.2:612.822.018.577.175.82].
014.46:615.919: 579.222

Ultrastructural Mechanisms Underlying Myelopeptide Effects on Brain Structures of Endotoxin-Treated Rats and Involvement of Receptor-Mediated Endocytosis

18400077c Moscow BYULLETEN

EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 105 No 6, Jun 88 (manuscript received
18 Aug 87) pp 730-733

[Article by E. A. Bardakhchyan, P. E. Povilayte and A. I. Polyak, Department of Morphological Research Methods, Central Scientific Research Laboratory, Rostov Medical Institute]

[Abstract] Ultrastructural studies were conducted on endotoxin damage of various brain formations in male, albino, 180-200 g rats, and on the mitigating effects of myelopeptide (MP) administration. Intravenous administration of 2 mg/100 g E. coli endotoxin (= LD₉₀) elicited profound ultrastructural changes in the sensorimotor cortex within 5 h the formation of vesicles, mitochondrial swelling, ischemic-type changes in the nuclei, granular changes in the epithelial cells, and rearrangement of epithelial organelles indicative of enhanced secretory activity. Damage was also evident in the choroid plexus with concomitant increase in permeability, destruction of the endothelium, diapedesis, hemorrhages, and thrombotic manifestations. Pretreatment of the animals with intramuscular MP, 2 mg/100 g, 24 h before endotoxin administration exerted a protective effects and markedly attenuated ultrastructural evidence of endotoxin damage in the brain. The efficacy of MP was attributed to its binding to neuronal receptors and competitive inhibition of lipopolysaccharide binding, preventing thereby internalization of the endotoxin. Significantly, MP also preserved the patency of the blood-brain barrier without affecting the blood clotting mechanisms. Figures 3; references 13: 11 Russian, 2 Western.

UDC 612.89+577.15/17

**Modulation of M-Cholinergic Responses by
Venom of Central Asian Cobra**

18400101a Leningrad FIZIOLOGICHESKIY
ZHURNAL SSSR IMENI I. M. SECHENOV
in Russian Vol 74 No 6, Jun 88 (manuscript received
31 Mar 87) pp 791-797

[Article by T. P. Kichikulova, A. T. Berdyeva and B. N. Manukhin, Laboratory of Intercellular Interactions, Institute of Developmental Biology imeni N. K. Koltsov, USSR Academy of Sciences, Moscow]

[Abstract] The modulating effects of the Central Asian cobra (*Naja naja oxiana*) venom on the cholinergic response of the small intestine were evaluated in vitro on intestinal preparations obtained from Wistar rats. The studies were conducted in Tyrode's solution at 33 and 37 degrees C. The kinetic data were consonant with a noncompetitive effect of the venom on the preparation, leading to increased responsiveness to acetylcholine by 30 to 70 percent. The effects of the venom were temperature-independent and persisted for 60-90 min after repeated washings. Preincubation of the intestinal preparation with acetylcholine prior to addition of the venom was without effect on the outcome. The latter suggests that the venom had no direct effect on the acetylcholine receptors. Figures 6; references 19: 13 Russian, 6 Western.

UDC 612.822.3

**Inactivation Kinetics of Tetrodotoxin-Susceptible
Sodium Channels in Rat Spinal Ganglia**

18400101b Leningrad FIZIOLOGICHESKIY
ZHURNAL SSSR IMENI I. M. SECHENOV
in Russian Vol 74 No 6, Jun 88 (manuscript received
18 Sep 87) pp 802-808

[Article by G. N. Akoyev, S. A. Kirov, B. V. Kyrlov and S. A. Podzorova, Laboratory of Reception Physiology, Institute of Physiology imeni I. P. Pavlov, USSR Academy of Sciences, Leningrad]

[Abstract] An analysis was conducted on the inactivation kinetics of tetrodotoxin-sensitive sodium channels in the L₅-S₁ dorsal root neurons of Wistar rats. The studies were limited to neurons showing complete inactivation of sodium channels with 5×10^{-8} M tetrodotoxin, with precautions taken to exclude potassium and calcium currents. Single-pulse response studies involving potential changes from -100 mV to different levels of depolarization revealed a sodium current with a rather complex decline pattern. Inactivation consisted of an initial rapid phase, eventually replaced by a slow phase. Recovery of conduction was also complex and nonlinear. Analysis of the second order inactivation kinetics demonstrated that at, for example, -46 mV the duration of the rapid phase was 2 msec and that of the slow phase 12 msec. Double impulse studies provided confirmation for the data obtained with the single impulse studies, as did $\ln(1/h_{\infty}-1)$ vs. E plots. The data for the tetrodotoxin-sensitive channels in the rat dorsal root ganglia thus differed from the Hodgkin-Huxley model which postulates independence of membrane activation and inactivation as regards sodium permeability. These observations indicate that a double gating mechanism for sodium conductance should be applicable to tetrodotoxin-susceptible sodium channels in the model system under study. Figures 5; references 19: 7 Russian, 12 Western.

Prevention of Hereditary Diseases

18400006 Moscow IZVESTIYA in Russian 11 Aug 88 p 2

[Article by N. Bochkov, academician of the USSR Academy of Medical Sciences, Moscow: "To Ward off Trouble"]

[Text] The number of hereditary diseases (about 3,000 are known) has been growing recently. Their place in the general disease rate is also changing. As other, formerly dangerous, diseases lend themselves to treatment and recede into the background, these ailments transmitted from parents to children come to the foreground.

From 60,000 to 100,000 children burdened by serious hereditary ailments are born in our country every year. From the first day they need special care and treatment. This is a heavy burden for society and a real tragedy for many families.

It must be admitted that our medicine does by no means everything to prevent or ease this trouble. In order to forecast hereditary diseases at the proper time, first of all, a prompt and accessible medical-genetic consultation is needed. The first medical-genetic offices appeared in our country 20 years ago. At first there were only 5 of them and now there are about 90. About 80,000 families from risk groups annually receive consultation in these offices. Not each of these families is threatened with the appearance of a seriously sick child. Having examined all the mentioned family couples, physicians prevented serious diseases in 4,000 children.

This is far from sufficient for the entire country. Scientific forecasts and the experience of other countries show that there should be four or five times more medical-genetic offices. Then they will be able to give competent consultation to all the families that need help. There are approximately 250,000 to 300,000 such families in the country. However, the problem lies not only in the number of offices. Those that operate now are by no means fitted with the necessary equipment. Many operate under crowded conditions. There is a shortage of microscopes and reagents. Specialists are also needed. They must be trained in an accelerated manner.

According to the most modest estimates, the annual birth of tens of thousands of seriously and hopelessly sick children costs the state approximately 300 million rubles annually. This represents only the children's support, treatment, and care. And the losses in the economy owing to the fact that parents cannot work in accordance with requirements? And in what money and according to what scale should the suffering of these children and their relatives be counted? No matter how one looks, the "economy" in this is a dead-end road.

In addition to an examination of married couples there is also such a form of forecasting health as a prenatal diagnosis of the state of the fetus. It is carried out by means of an ultrasonic examination, which is harmless

for mother and child, and a study of fetal cells. For now both exist only in several big cities. If all pregnant women underwent at least an ultrasonic examination, the birth of 5,000 to 6,000 children with serious congenital defects, with which a normal life is impossible, could be avoided.

If a baby with certain hereditary ailments is born, even then an early diagnosis and treatment can help in many cases. This especially applies to some hereditary metabolic disorders.

Many are to blame for the poor condition of medical-genetic aid. They include the long-term neglect on the part of the USSR Ministry of Health (the strategy of control of hereditary diseases has not been formed and there is not even an administration or a department for medical-genetic aid). Nor do we relieve ourselves of the blame. Scientists at the Institute of Medical Genetics of the USSR Academy of Medical Sciences and its management paid little attention to the introduction of scientific developments into practice. The Academy of Medical Sciences insufficiently financed our branch. Nor can one suspect local public health bodies of having excessive zeal in the detection and treatment of hereditary diseases.

A special meeting of the board of the USSR Ministry of Health devoted to medical-genetic aid was held recently. It was decided to develop republic programs for the detection of hereditary diseases and their prevention and treatment.

The All-Union Scientific Medical-Genetic Center of the USSR Academy of Medical Sciences, which is being established now, will supervise all this work in the country.

We also greatly need the participation of institutes of the USSR Academy of Sciences. Without its help it is difficult to eliminate the significant lag in the field of science. The "big" academy could join in the development of Soviet methods of detecting such serious hereditary diseases as mucoviscidosis, hypofunction of the thyroid gland, the adrenogenital syndrome, and others.

It is within our power to reduce the burden of these ailments. Sick children and very many families expect this from us.

Rural Morbidity Statistics

18400070 Moscow EKONOMICHESKAYA GAZETA in Russian No 37, Sep 88 p 19

[Article under the "USSR State Committee on Statistics Communicates" rubric: "Rural Morbidity"; final two paragraphs are a note from the EKONOMICHESKAYA GAZETA editor and a question posed to Ye. I. Chazov, USSR Minister of Public Health]

[Text] As of the beginning of 1988, a third of the USSR's population was living in rural areas.

Because of the rural birth rate, the population will continue to expand through reproduction. The average number of births per woman is 3.7 (versus 2.1 in urban areas), as opposed to the 2.2-2.3 required for simple reproduction. The birth rate for the year 1987 rose 18 percent as compared with 1980 (versus a 4 percent increase in urban areas), which amounts to 24 births per 1,000 population, which exceeds the figure for urban residential areas by a factor of 1.4.

A marked increase in life expectancy—2 years (2.5 years for males) over what it was in 1984-85—has been noted in rural areas in the past few years. This nevertheless remains 1.9 years (2.3 years for males) lower than the life expectancy among the urban population.

During the past 7 years, polyclinics accommodating a total of 190,000 visits per shift have been built in rural areas through all sources of financing. There has been a 61 percent increase in the average yearly introduction of polyclinics, as compared with 1980, and an increase of 89,000 hospital beds (a 23 percent increase).

The level and quality of medical care provided to the rural population lags significantly behind that available in urban areas. The numbers of physicians, outpatient and polyclinic facilities, and first aid (or emergency) medical assistance available to residents of rural areas are about half the amount available to persons living in urban areas. It is primarily mid-level medical personnel that service the public. Paramedic-obstetric centers are the main medical institutions close to where the members of the rural population live (43 percent of all rural population centers are within their territory).

As of 1 January 1988, about 143,000 villages surveyed (accounting for 13 percent of the country's rural population) had no health care institutions at all. Only 21 percent of all large villages (with over 500 inhabitants) had hospitals in their area, 32 percent had outpatient-polyclinic facilities, and 76 percent had paramedic-obstetric centers. More than 4 million persons living in large villages must travel 3 or more kilometers from their residences to obtain primary medical assistance.

Number of Patients With First-Time Diagnoses

	Thousands			Per 100,000 Population		
	1985	1986	1987	1985	1986	1987
Malignant neoplasms	195.6	201.4	207.1	202.1	208.6	214.9
Tuberculosis	53.0	52.5	51.4	54.7	54.3	53.3
Acute intestinal infections	485.7	509.4	505.8	501.8	527.5	524.8
Viral hepatitis	418.1	390.6	434.3	432.0	404.5	450.7
Influenza and acute upper respiratory tract infections	10,554.4	10,251.7	7,934.7	10,904.3	10,616.4	1,064.2

Morbidity involving active tuberculosis among persons living in rural areas is 1.4 times higher than among their urban counterparts, and in the Belorussian, Moldavian, and Ukrainian SSR it is between 1.5 and 1.7 times higher.

Low-quality prevention efforts in rural areas are one cause of this high morbidity. Each year, more than 60 percent of rural inhabitants are examined to screen for tuberculosis. In the Transcaucasian republics, this figure is between 39 and 47 percent. The effectiveness of these examinations, however, is extremely low. Almost a third of those suffering from tuberculosis of the respiratory organs in 1987 had a chronic form of the disease.

Poor conditions in rural population centers and a low level of public health awareness in rural areas were responsible in 1987 for a 5 percent increase in acute intestinal infections over 1985 and a 4 percent increase in viral hepatitis, which amounts to 525 and 451 cases per 100,000 population, respectively. In 1987, morbidity due to viral hepatitis in rural areas was twice that in urban areas.

Note from the editor. As we have discovered, the USSR Ministry of Health does not provide the USSR State

Committee for Statistics with information concerning the number of treatment and prevention institutions and the number of medical personnel, broken down by urban versus rural location.

Why not?—This question is for USSR Health Minister Ye. I. Chazov.

Latvian Minister of Health Outlines Restructuring
18400072 Riga SOVETSKAYA LATVIYA in Russian
16 Aug 88 p 2

[Article by V. Kanep, LaSSR Minister of Health under the "From the Tribune of the Party Conference to Life!" rubric: "The Health Service: First Steps of Restructuring"]

[Text] Protecting the health of people in a Soviet country is a state concern. Our successes in this area are indisputable; however, more than a few problems have accumulated. Let us take such an important indicator as infant mortality. Each year slightly more than 11 children of each 1,000 born in the republic die. This indicator has been the best in the country for nearly two five-year-plans. That's not bad, it would seem. Among

European countries, however, we rank only 20th. We are proud of our high number of physicians per number of inhabitants. Quantity does not automatically translate into quality, however. On average, on a given day, more than 40,000 persons throughout the republic are absent from work because of illness. Although this indicator is far from being the worst in the country and although it has decreased nearly 14 percent during the past five-year-plan, we cannot be satisfied.

The period of restructuring demands the reassessment of many policies. We must also work not for individual indicators but rather for the end result—strengthening the public's health. Therefore, after analyzing the situation that has evolved and developing a program for restructuring health care, we have identified three main factors: national, personal, and medical. The main task is to have them act in a way that will intensify and supplement one another.

On the national level, special emphasis must be placed on solving economic problems; on improving labor, daily living, recreation, and environmental conditions; and on solving the medical problems that are related to these areas. Working out state programs to provide the public with food products and shelter and to mechanize and automate the workplace will facilitate this matter. Increasing public well-being is a necessary foundation for improving public health.

The issue of having medical personnel take part in solving ecological problems is a separate topic for discussion. After critically assessing all that has been done in this area, we must admit that we have done little. This is especially true if the tempo of the chemicalization of agricultural production and the growth of industry and transport (which are given priority over environmental protection measures) are considered. We are now paying considerably more attention to these problems. Even though we have reduced the number of workers in the health care apparatus by nearly a third as a result of the reorganization of the Ministry of Health, we have preserved a special administration for public health and epidemiological work and problems of medical ecology. The situation in Ventspils, Olayne, Yurmala, and, of course, Riga is under our special control.

As far as the personal or behavioral factor is concerned, however, it must be admitted that for the present we have yet made any appreciable progress in the fight against habits that are harmful to health—smoking, alcohol use, lack of exercise, and overeating (especially of carbohydrates). It is therefore difficult to gain a victory over such widespread diseases as atherosclerosis, ischemic heart disease, hypertension, respiratory tract diseases, diabetes mellitus, gallstones, and cancer.

The third important factor is that of improving the medical care provided to the public. Capital investments for medical equipment have already increased 2.5-fold in this country. Forty percent of all resources allocated

are directed at the priority construction of maternity hospitals, prenatal care clinics, and pediatric hospitals and polyclinics. Special attention will be given to the rural population.

During the current five-year-plan the following have been or will be put into operation in the republic: maternity hospitals in Riga, Yurmala, Yelgava; a central district hospital in Dobeles; a surgical facility of the Republicwide Stomatologic Outpatient Clinic; a facility of the LNIITO [not further identified]; an infectious disease department in Kuldiga; and other facilities. Approximately 200 new hospital facilities, outpatient clinics, public health and epidemiological stations, and pharmacies were built in the republic during the 10th and 11th Five-Year-Plans.

Have they always operated efficiently, however? It must be admitted that this has not always been the case. For this reason, from an extensive increase in bed capacity and outpatient-polyclinic institutions, we are switching the sector over to a course of intensive development and are increasing the efficiency of medical institutions' activities. They must be made more mobile and easier to redesign and reequip with new medical equipment and technology. To accomplish this it has been necessary to improve the sector's administrative system.

The number of administrations and departments in the Ministry of health has been reduced by 40 percent, and their functions and tasks were reassessed. In the republic, two large associations pertaining to commerce and industry—Farmatsiya and Medtekhnika—are currently in the organization stage. The Ministry of Health is currently concentrating its attention on developing medical science; on redesigning, constructing, and reequipping the branch; and on training and retraining the personnel in the sector and updating their skills.

The Minzdrav automated management system that we have created will also help better manage our complex sector, which numbers about 70,000 workers. It currently includes 15 subsystems and performs about 1,000 tasks. In addition, we have transferred many of our functions to the treatment institutions, and they are making decisions independently. Some examples include the Republicwide Pediatric Clinical Hospital, the Hospital imeni P. Stradyn, the Traumatology and Orthopedics Scientific Research Institute, and the Cardiology Scientific Research Institute.

The sector's activity can't be improved unless diagnosis and treatment are improved, as well as preventive care. With regard to the first part of this two-part task, it must be said that, in the mid-1980's, modern medical technology, chemical agents, and drugs were provided to the sector in a manner that was simply disgraceful. This problem extends beyond the republic. Throughout the country, the depreciation of the fixed capital of medical enterprises amounts to 50 percent, and in some cases nearly 100 percent.

The shortage of medical equipment has also affected the quality with which it is produced. Of course, we are not sitting on our hands, waiting for help. First of all, we are saturating our institutions with technology and equipment, developing our pilot production, and making direct contacts with foreign firms. Secondly, we are concentrating expensive, unique equipment in diagnostic centers. Two such centers, based at the Republicwide Clinical Hospital imeni P. Stradyn and the No. 7 Municipal Hospital, had already been organized at the end of the past year.

This year, the total fund for medical equipment and instrumentation in the republic amounts to 14.6 million rubles, which is 1.7 million rubles more than last year. This is a vivid example of the change in attitude toward our requests. In just the first half of the year, republic health care institutions received and put into operation 5 x-ray machines produced in the GDR, 12 stomatologic units of the Khiradent type (produced in Czechoslovakia), 20 defibrillators from England, and a number of other expensive pieces of equipment.

A related problem is the provision of medications. Resources in an amount that is several times in excess of the capital investments made to develop the country's pharmaceutical industry have been allocated to purchase medications from abroad. The decision has been made to develop domestic production. But this requires time. Meanwhile, thanks to an increase in purchases this year as compared with the same period last year, the cost of imported medications alone has increased by 500,000 rubles. It is expected that, overall, 3 million rubles more will be spent on medications this year than last year, and, compared with this year, the order for next year is 6.2 million rubles higher. Various medications that are in short supply have been purchased in different regions of the country at a cost of 480,000 rubles.

But equipment and medications are only effective in the hands of highly skilled physicians. It must be admitted that, besides sincere, grateful letters, we also receive more than a few letters criticizing medical personnel and district physicians. It was almost 2 years ago when we abandoned the mandatory "registration" of residents with their own district physician. Each has the right to choose his or her own physician. Next year we intend to introduce a new form of primary care provider—the family physician—as an experiment.

New organizational forms—in particular, medical cooperatives—have come to play a definite role in our lives. Sixteen medical cooperatives are currently operating quite successfully in Riga, Daugavpils, Liyepaya, Rezekne, and Ludza. Another seven are in the organization stage. Above all, they have been charged with meeting public demand for those types of medical assistance that are currently lacking in state public health institutions—massage, balneotherapy, reflexotherapy, homeopathy, physical rehabilitation, and certain types of stomatologic assistance.

We are also planning to develop these types of medical assistance in our hospitals, polyclinics, and outpatient facilities as well as through cooperatives, whose operation will, of course, be kept under our control.

The quality of physicians' work and their skill level are always at the center of attention of the sector's administration. Elements of formalism have, however, been allowed in the certification of medical personnel. The demands have now become stricter. Thus, last year more than 20 physicians had their skill category reduced or taken away entirely.

To improve service to the public, we are paying particular attention to the international and patriotic education of our personnel. All medical personnel need a knowledge of local ethnic and historical features, equal mastery of two languages, and a broad general education. Of course, mercy is a universal human concept; however, knowledge of local conditions and the language helps a physician perform his professional duties better.

And now for several words about the development of medical science in the republic. Serious reorganization measures have been taken. Today nearly half of medical science has made the transition to cost accounting. Social orders of the branch administrations constitute one-tenth of the remaining 50 percent of research projects conducted on the basis of budget finance. We hope that this turn toward the direction of the needs of practical health care will increase the efficiency of science.

In March of last year, the Presidium of the republic's Council of Ministers confirmed the intersector comprehensive program "Zdorovye" [Health] for the period of 1987 to 1990. Its principal purpose is to strengthen the workers' health, improve their fitness for work, help them establish a healthy life-style, and prolong their active lives. Morbidity with a loss of work time must be reduced by 10-15 percent, and no fewer than 58,600 workplaces must be brought into conformity with labor protection norms (especially for women). A number of other burning problems must also be solved.

In the general framework, valuable programs yielding specific economic objectives and summary indicators have been developed in Liyepaya and Yurmala and in the Valmiyerskiy, Rezeknenskiy, and Orgskiy rayons. But then the programs in the Ventspilsskiy, Liyepayskiy, and Ludzenskiy rayons and in Yelgava do not specifically reflect the issues of improving work conditions or making the environment healthier.

At the initiative of the Latvian Republicwide Council of Trade Unions, we have concluded an agreement to develop a comprehensive scientific research effort to provide scientific support to the "Zdorovye" program.

The positive trends that have been noted demand in-depth and single-minded efforts to restructure the entire state system for protecting public health. This is our specific task for today. Solving it requires considerably more responsibility and a creative attitude on the part of all medical personnel and directors of medical institutions.

UDC 614.2(575.4)

Ways of Restructuring Health Care in the Turkmen SSR at the Current Stage
18400084 Ashkhabad ZDRAVOOKHRANENIYE TURKMENISTANA in Russian No 6, Jun 88 pp 3-8

[Article by K. B. Chagylov, TuSSR Minister of Health]

[Text] The 27th Congress of the CPSU and the subsequent plenums of the Central Committee of the CPSU have affirmed with new vigor that taking care of the Soviet individual, raising the level of his well-being, and improving working conditions remain among the primary goals of the Party.

The decree of the Central Committee of the CPSU and the USSR Soviet of Ministers "Basic Guidelines for Protecting Public Health and Restructuring Health Care in the USSR in the 12th Five-Year Plan and Up to the Year 2000" is a continuation of the resolutions of the Party involving intensified efforts to strengthen the health of the Soviet people, involving the lengthening of their active lives, and involving the need to radically restructure health care in the country.

Stagnation found its way into health care in recent decades. This is true of our republic, even more so than of other regions of the country, and is exemplified by unfulfilled plans for construction of health care facilities, a weak material and technical base for existing treatment and prevention facilities, and high rates of infectious disease and infant mortality.

But the question today has been posed in another manner. The job of health care organs and of every labor collective is not shift the blame to the past, but to begin implementing the expansive program adopted by the decree on the radical perestroika [restructuring] of health care. But protecting public health should not and cannot be merely the lot of medical people. And the sooner that is understood in other ministries and departments, and the quicker there is a psychological improvement among medical personnel as well as in the consciousness of all workers—which is facilitated by the principles of glasnost, democratic bases, and the new norms of social life being developed—the more intense and single-minded the perestroika of health care operations will be.

Essentially, all the necessary conditions are being created for the realization of the programs involving the radical perestroika of health care and the improvement of the

quality of medical care given the people in the republic. Assurance of that comes in the increased attention the Central Committee of the Communist Party of Turkmenistan and the government of the republic are devoting to health care problems and in the real, day-to-day help they are providing in the handling of urgent problems associated with protecting public health. That has made it possible to make some positive changes in the work of health care agencies and enterprises.

Only the first steps have been taken, however, and the situation involving the protection of public health remains critical.

One serious problem in the republic's health care is associated with a weak material and technical base. In the 12th five-year plan, the republic will see the introduction of capacities through all sources of financing: 5,400 hospital beds, and outpatient and polyclinic facilities that can handle 9,300 visits per shift. This is a threefold increase over the previous five-year plan. Over the last two years, the plan for putting hospitals and polyclinics into operation has been fulfilled for the first time in the republic (1,720 hospital beds and 3,700 clinical visits per shift). At the same time, the capacities introduced during this five-year plan cannot eliminate the existing shortage of hospital beds and outpatient and polyclinic facilities.

In spite of that, capital investments for construction of health care facilities are not being properly appropriated in the republic from year to year. For 1987, for example, 84 percent of the capital investments needed were appropriated, including only 77 percent of those for construction and installation work; an even worse situation exists with the appropriation of capital investments through Communist subbotnik funds, which for decades have been appropriated at a level of 60 percent. This proves once again that the leftover principle—the secondary importance of construction of health care sites—remains in effect.

In the situation that has come about with the construction of health care facilities, a large part of the guilt is with health care agencies, which have had a weak effect on the rate of construction, having transferred these matters to the UKSs [no further expansion] of the oblast ispolkoms [executive committees]. We must clearly recognize that it will be impossible in the coming five-year plan to overcome the existing lag in the material and technical base of health care via construction of new hospitals and polyclinics alone. This obliges us to find new ways to strengthen the base of medical facilities, primarily to renovate existing treatment facilities.

And today, with the possibility of channeling state capital investments to the renovation of hospitals, we must begin performing this task gradually and more promptly.

Initiative construction [initsiativnoye stroitelstvo] is an appreciable resource in the strengthening of the base of rural health care. In 1987, a total of 28 facilities were put into operation. Some four million rubles are earmarked in 1988 for putting 75 facilities into operation.

No less important is the matter of the equipment and inventory supplied to health care facilities and their efficient use and operation. Over the last two years, supply to treatment and prevention facilities has grown by a factor of 1.5; to children's and maternity facilities, it has grown almost twofold.

The level of supply of modern medical equipment to treatment and prevention facilities, however, still fails to meet today's needs. The republic is short of x-ray diagnostic equipment, monitoring equipment, ultrasound equipment, and endoscopic equipment. Rural health care facilities continue to be poorly equipped.

Cases are encountered, however, in which existing equipment is used inefficiently and ineffectively and in which expensive, modern equipment is left to stand. The main reason for this situation is an inadequate requisition process, insufficient allocations for equipment acquisition, and a poorly developed maintenance system. But these matters can be resolved. All that is needed is a responsible attitude and persistence in the search for solutions to the problems. Moreover, there are at present no equipment criteria in the health care system. Unfortunately, the table of medical gear and equipment, authorized by order of the USSR minister of health in 1963, is clearly out of date, and authorization of a new list has been dragged out for an inexcusably long period of time. For that reason, the appropriate administrations of the TuSSR Ministry of Health, in conjunction with specialists from research institutes and TODNGMI [no further expansion], have begun to develop a rough table of equipment for the treatment and prevention facilities in the republic. Solving this problem will make it possible to more accurately plan the supply of the appropriate medical equipment to medical facilities.

It is the personnel who will decide the fate of the perestroyka of health care. No matter how many new hospitals and polyclinics are built, we cannot not move ahead a single step without dealing with the personnel question.

The February 1988 plenum of the Central Committee of the CPSU examined the matter of the course of the perestroyka of middle and higher schools and the problems facing the Party in performing that perestroyka. In the implementation of the decision of the plenum, a great deal of work remains to be done in improving the preparation, training, and placement of medical personnel. At present, the republic is substantially below the union level in terms of physicians and mid-level medical personnel. The shortage of physicians will remain in the 12th five-year plan, too. The TuSSR Ministry of Health is taking measures to boost the number of medical

personnel. Every year, beginning in 1988, some 80-100 young specialists from higher educational institutions (VUZes) of the RSFSR and the Ukraine will be sent to the republic, and the number of students sent to other VUZes of the country will grow (up to 100). Between 180 and 200 TODNGMI graduates will do their internships at bases of health care facilities in the RSFSR and the Ukraine. The learning requirements of the students will also be reexamined.

The practice of enlisting sixth-year students of the pediatric faculty and pediatric physician-interns to provide care in rural areas is a positive thing. The year 1987 saw the enlistment of 196 students and physician-interns, who not only provided practical health care, but also improved their own practical skills.

At the same time, there are serious deficiencies and omissions in the quality of training the students receive. This involves, primarily, the matter of selecting youth to enter medical institutes. Another problem—of no less importance—involves the need to raise the level of the training process.

Skill-improving courses that travel to central institutes for the advanced training of physicians are being used on a wider basis. In 1986-87, this made possible a threefold increase in the number of physicians trained in a special area. One effective form of improving occupational skills involves certification and re-certification of physicians, and in connection with this the requirements for the work of the certification commissions have been raised.

The Basic Guidelines identify the quality of medical care as a key problem. Primary health care units bear a considerable portion of the burden of solving this problem, since 80 percent of the population gets its medical care in outpatient and polyclinic facilities. Preventive work and mass health screening of the population must become the primary area of activity of such polyclinics. Polyclinics must work toward the end result of improving the health of the population in their own regions. The TuSSR Ministry of Health and its agencies are doing specific work in some areas to improve this service. Over the last two years, the system of outpatient and polyclinic facilities grew by 51 units, and physician staffing reached 97.6 percent. The subdivision of territorial districts is, for the most part, finished, and there are 1,755 persons per treatment district and 825 persons per pediatric district. That approaches the average for the Union. Work is being done to put the operations of the outpatient and polyclinic facilities in order.

The poor material and technical base and the inadequate medical equipment of the outpatient and polyclinic facilities are, along with the absence of a full line of auxiliary services, the main causes of the serious problems being experienced in organizing medical care for the public at the prehospital stage. This has led to overcrowding and prolonged terms of treatment at hospital facilities.

The best new forms and methods in medical service must be searched out promptly and introduced. Such progressive methods and forms are already being used—day hospitals in polyclinics, permanent home health care [stationary na domu], offices and departments for rehabilitation. In Ashkhabad, for example, day hospitals for caring for pregnant women have been open in the polyclinics since 1987.

The Basic Guidelines have set a goal of reducing sickness accompanied by temporary disability by 15-20 percent by the year 2000. The success of the undertaking will hinge on the conduct of broad-based preventive measures and on the level and quality of mass health screening of the population.

The guiding force for accomplishing this task must be the republic-level program Zdorovye, which clearly specifies measures for improving ecological and sanitary conditions in the republic, for teaching and encouraging a healthy lifestyle among the population, and for improving working conditions and safety equipment among the workers and toilers in rural areas. One of the main sections of the program involves preventive checkups and mass health screening.

Deserving some attention in that regard is the new form of preventive checkup begun last year in the republic for purposes of early detection of oncological diseases and tuberculosis. It has screened more than 740,000 people—536,000 for tuberculosis, and 211,000 for oncological diseases. Analysis of a month's work showed its effectiveness: detection [vyavlyayemost] of disease rose almost twofold. Organizational deficiencies were identified during the month, which are explained by the absence of similar experience in the country.

The Treatment Administration of the TuSSR Ministry of Health, scientific research institutes, and oblast and city health care departments must use the mistakes that have been made to perfect this form and raise its efficiency. The month-long campaign of preventive checkups must be used as a form that supplements the basic activity of outpatient and polyclinic facilities in the conduct of preventive measures.

A great deal of attention is being devoted in the republic to medical care for the rural population. Five central rayon hospitals with 960 beds have been built and placed into operation, as have 14 SUBs [not further expanded], 24 SVAs [not further expanded], and 21 FAPs [not further expanded]. As a result, the figures for hospital beds and outpatient and polyclinic facilities have grown somewhat, and they are 95 and 109 per thousand, respectively. At the same time, the level of medical care rendered to the rural population remains, by and large, below that rendered to the urban population.

Mobile medical care, which would make it possible to bring medical care to rural residents who live in remote areas, is not used to the fullest. Experience exists in this

matter, and it must be disseminated more widely. At the same time, the expansion of mobile medical service is having some difficulties, which are associated with the acute shortage of portable equipment. We feel, however, that this matter can be fully resolved.

The safety of mothers and infants remains a serious problem. The Basic Guidelines view the health of mother and infant as a priority area in the development of health care. This problem is especially acute for our republic, where maternal and infant mortality remain at a high level. Specific measures have been identified to solve the problem, and the participation of all Party and soviet organs, ministries, and departments has been clearly delineated.

Health care organs and institutions and the heads of all units must utilize the effective help and profound interest of the Central Committee of the Communist Party of Turkmen SSR in this matter and must double their own efforts and mobilize groups of medical institutions to carry out the expansive program outlined for the protection of mothers and infants.

For the first time in many years, positive, if small, shifts have begun to emerge in the republic. Measures are being taken to strengthen the material and technical base of children's and maternity facilities. Of the total number of hospitals and polyclinics placed in operation, the percentage of children's and maternity facilities has grown to 40 percent from 10.

Especial attention has been devoted to matters involving the number of personnel and the improvement of occupational skills. In the last two years alone, the number of pediatricians has grown to 14.0 per 10,000 people from 10.7, and the number of obstetrician-gynecologists has grown to 2.3 per 10,000 from 1.8 (the Union averages are 20.6 and 2.4, respectively).

Twice as many pediatricians and obstetrician-gynecologists updated their skills in 1987. Examinations were conducted for the first time for pediatricians and obstetrician-gynecologists, with subsequent re-certification of individuals who had received unsatisfactory evaluations. The method has demonstrated its effectiveness, and we need to promptly extend it to other medical specialties as well.

Comprehensive analysis of the status of the safety mothers and infants revealed the need to search for new, more effective forms and methods of organizing medical care that take into account the specific nature of the republic. Over the last three years, more than 10 such forms and methods have been introduced that have proven to be highly effective in practice.

An extremely alarming epidemiological situation has emerged in the republic in terms of intestinal infections. In 1987, the morbidity rate for viral hepatitis grew by 32 percent among the population; it grew by 46 percent for serum hepatitis. The morbidity level for typhoid fever is

8.5 times that of the Union average. The highest figure for typhoid remains in the Krasnovodsk Oblast—132 per 100,000 people. The morbidity rate grew by 25 percent for meningococcal infection and doubled for anthrax.

The morbidity rate for controlled [upravlyayemaya] infection among children is high. Morbidity for poliomyelitis, for example, exceeds the Union average by a factor of 2.5; diphtheria exceeds the average by a factor of 2.2; and measles exceeds it by a factor of 1.4.

The basic cause for the high level of morbidity for intestinal infections remains, primarily, the unsatisfactory condition of water supply and sewerage of population points and their extremely low level of sanitation.

In this situation, however, health care organs and facilities and medical personnel bear primary responsibility for the epidemiological well-being in the republic and for the state of infectious morbidity among the population.

The extensive approach still reigns in the work of the health and epidemiological service. The primary orientation of the work is on quantitative indices in the conduct of preventive and routine health inspection. The effectiveness of state health inspection is not taken into account here, and the results are not linked to health indices for the population.

State inspection organs are not fully using the broad rights they have for maintaining health and epidemiological norms when they exercise their authority, and they are thereby showing a lack of principle. Serious omissions are allowed in the conduct of immunoprophylactic work among children that is aimed at controlled infections: poliomyelitis, diphtheria, and measles.

There are many deficiencies in the quality of inoculation work and in the storage and use of inoculation materials. In the Tashauz Oblast Health and Epidemiological Station, for example, which has refrigeration units, vaccines are kept in conditions that are inappropriate for storage. Inoculations can have no effect for that very reason. And it was not mere chance that in Chardzhou in 1987, inoculated children accounted for more than half of the 584 recorded cases of measles.

At present, we are changing over to a new method for inoculating against poliomyelitis and diphtheria that takes into account the climatic and geographical conditions of the republic. The first round of combined immunization was done in March. This important measure will make it possible to sharply lower morbidity for poliomyelitis and diphtheria in the republic.

Much remains to be done in terms of medicinal supply to the population. A broad system of pharmacy facilities has evolved in the republic; in the past two years alone, 20 pharmacies and 1,070 pharmacy stations opened.

Special children's pharmacies have opened in Ashkhabad and in all the oblast centers.

However, the Main Pharmacy Administration and the oblast pharmacy administrations are reorganizing their work slowly. The material and technical base of the pharmacy system remains poor, and there are not enough warehouse facilities (50 percent below the norm). Things are not going well with personnel. The system has only 40 percent of the druggists its needs. Of the 1,277 druggist positions, more than 700 are occupied by pharmacists with a secondary education. The drug supply to the population is sometimes interrupted, mainly because of serious omissions on the part of the pharmacy administrations and health care organs when they are ascertaining the actual needs for medications.

Serious violations in the sale of medications continue, as do such practices as speculation with extremely scarce drugs.

The management of the Main Pharmacy Administration must change the style and methods of operation radically and must firm up and increase the personal responsibility of pharmacy workers for the state of affairs where they work.

Medical science should find a worthy place in the course of perestroyka. In spite of definite progress in the activity of scientific institutions, scientific research and efforts are often isolated from practical health care. Trivial subject matter predominates in scientific research, and little research is done that is aimed at the urgent problems of the republic's health care.

At present, the TuSSR Ministry of Health is developing a new structure for scientific institutions that aims at strengthening them; that will make it possible to focus scientific potential on the pressing problems of practical health care.

The republic's health care is faced with enormous tasks, and accomplishing them is possible only by means of efficient measures, the elimination of outdated approaches and methods, and the expansion and deepening of glasnost and democratization in the activity of the health care organs and institutions of all units.

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Diet of Pregnant Turkmen Women in Ashkhabad
18400038a Ashkhabad ZDRAVOOKHRANENIYE
TURKMENISTANA in Russian No 4, Apr 88 pp 23-25

[Article by G. Ye. Khodzhaeva, Zh. M. Apresyan, S. V. Orlova, and N. R. Khalmuradova, Scientific Research Institute of Mother and Child Health Protection (Director: Professor V. Ye. Radzinskiy), TuSSR Ministry of Health]

[Abstract] Caloric and nutritional value of the diet of pregnant Turkmen women was evaluated by a questionnaire method using 25 healthy pregnant women in 8-36

week of pregnancy. Only five of them had a physiologically-adequate diet; in 18 cases, the caloric intake was lower by about 30 percent and only two had a 40 percent increased caloric intake. Protein consumption was subnormal in almost all cases; fat intake was down 30 percent in 13 women and carbohydrates were down 19 percent in 17 cases. The diets did not contain eggs, fish, milk, cheese and the consumption of fresh fruit was very low. It was concluded that this nutritionally-inadequate diet was responsible for low birth weight of the newborns. Because of the fact that the cited foods were often not available in the stores, it is recommended that special allocations for pregnant women be made available and be handled through special stores reserved only for such cases. References 9: 8 Russian, 1 Western.

High Tuberculosis Incidence in Kazalinskiy Rayon, KSSR

18400073 Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 14 Sep 88 p 2

[Article by T. Muminov, candidate of medical sciences, Kazalinskiy Rayon, Kzyl-Orda Oblast]

[Abstract] Ecological factors (high levels of salt contamination in air) are normally blamed for abnormally high incidence of tuberculosis in Kzyl-Orda Oblast, an incidence 2.5 times higher than the national level, which in turn equals about that of the developing nations, worldwide. The cause is not ecologic, although endemically the patients infect everybody so that most of the inhabitants of that area could be carrying dormant TB bacilli. The author points to the deficiencies on the socio-nutritional level as the main cause of this disease: overpopulated, overcrowded living conditions due to multiple births, inadequate caloric and nutritious food intake, poor community sanitation. Prophylaxis should be the basis for control of TB: family planning (better to have fewer "hero" mothers with record births and more healthy babies), improved sanitation and improved living conditions.

Current Problems in Mass Screening of Children

18400083a Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 7, Jul 88 pp 19-21

[Article by S. A. Gagarina, Kazakh Scientific Research Institute of Pediatrics, Alma-Ata]

[Abstract] The CPSU Central Committee has expressed its concern for child welfare and health on numerous occasions, leading to a reassessment of the mass screening program as it affects the pediatric population in Kazakhstan. An analysis of the state of health of 1- and 2-year-olds in Kazakhstan and Alma Ata has demonstrated that within the 1st year of life 42.1 percent of the children in the republic were classed in the Group I health category, with 50.4 and 7.7 percent falling into

groups II and III, respectively. The corresponding figures for the children of Alma-Ata were 21.5, 74.8, and 3.4 percent. Data for 2-year-olds formed an analogous pattern. The study showed that, in addition, 70-80 percent of the children in the age bracket under discussion were at risk of development of various chronic pathologic complications due to underdevelopment and postneonatal complications. A low index of suspicion on the part of the examining physicians appears to indicate that some 40 percent of these children are not receiving adequate clinical pediatric management. This situation stems largely from the fact that primary attention is accorded to children with obvious pathology, while preventive care for healthy children is neglected. These findings point to the specific problems that must be addressed in order to transform pediatric mass screening into an effective health care program in Kazakhstan.

UDC 614.2(478):616.89-008.441.13

Current Tasks in Organization and Development of Drug Control Service in Moldavia

18400085b Kishinev ZDRAVOOKHRANENIYE in Russian No 3, May-Jun 88 (manuscript received 17 Nov 87) pp 32-34

[Article by N. A. Oprya and M. I. Moroshan, Department of Psychiatry, Kishinev Medical Institute; Moldavian Republic Drug Addiction Dispensary]

[Abstract] The drug treatment services network in Moldavia has undergone extensive restructuring in the last 2 years, with the creation of three interrayon drug treatment facilities and one republic-level facility. As a result, the number of hospital beds dedicated to drug addiction cases increased by 119 percent in 1985-1987. The drug treatment service now includes 41 drug treatment offices, 5 dispensaries, 3 drug treatment hospitals, and 3 drug treatment departments at the central rayon hospital. In addition, training of medical and allied health personnel in the prevention, diagnosis, and treatment of drug addiction cases has been expanded. One of the more objective proofs of the effectiveness of this new and intensified approach to the drug problem in Moldavia has been the apparent sharp decrease in the number of drunks on the street, at the workplace, and in public places, as well as the statistics that point to an 11 percent reduction in the growth rate of alcoholic cases in 1987. Treatment modalities have been upgraded to encompass acupuncture, reflexotherapy, psychotherapy, at the newest medicinal agents that are available. In addition, at the Soroka Central Rayon Hospital two mobile drug treatment services have been established to further enhance contact with the target population of patients. Although the progress that has been made in controlling and preventing drug abuse has been impressive, the health authorities in Moldavia are committed to even further improvements in this branch of public health.

UDC 616.1-036.86"742":313.13(571.16)

Temporary Incapacitance and Cardiovascular Diseases in Siberia

18400095 Moscow ZDRAVOOKHRANENIYE
ROSSIYSKOY FEDERATSII in Russian No 7, Jul 88
(manuscript received 28 Apr 87) pp 16-19

[Article by Ye. F. Levitskiy, V. I. Kun, V. V. Murzin and
M. Yu. Bykova, Tomsk]

[Abstract] Cardiovascular disease is the leading cause of mortality and incapacitance in Tomsk Oblast. Demographic analysis of the Tomsk Oblast was performed in an attempt to develop effective preventive measures. Population of Tomsk is 51,800 inhabitants living in 48 population points, only one of which has city status. The remainder of the population lives along navigable rivers of this territory. Health service is provided by one

municipal hospital, two uchastboks and 22 feldsher-midwife points. Total patient beds is 100 and there is only 1 cardiologist to serve this area. Analysis of ischemic heart disease and hypertension cases showed that they are age-related, the maximum losses beginning at the age 50; among men cardiologic cases prevailed, hypertension was more prevalent among women. Analysis of the population data showed that morbidity with time loss due to incapacitance (MTLI) in this area did not differ much from that of other regions of the USSR. To lower this index, it would be necessary to create an effective system of screening dispensarization for cardiac problems, to improve earlier detection of this disease coupled with adequate treatment and preventive measures. The first task would be to bring specialized medical service closer to the population at risk, using automated mobile systems like the mobile automated system of specialized cardiologic aid (MASSCOA) and tying it in with primary units of local health service. References: 6 (Russian).

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